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DESIDOC Journal of Library and Information Technology: A Gender Perspective

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ABSTRACT

The present study aims to study the research articles published in *DESIDOC Journal of Library & Information Technology* during 2008-2017 with a gender perspective. Influence of gender was assessed at individual and collaborative levels, professional engagement and citedness. The findings reveal increase in the overall presentation of male authors i.e. 401 (75.38 %) compared to female authors 131 (24.62 %) of total of 532 authors. 345 (64.85 %) are multiple authored articles compared to 187 (35.15 %) single authored papers. Collaborative pattern of male-male authors with 205 (38.83 %) articles, followed by articles contributed by male solo authors with 160 (30.08 %) authors, outnumbers all other collaborative authorship patterns. A chi square value of ($x^2 = 11.801$, $p = 0.003$) shows significant difference in the number of contributions by both male and female authors engaged in different LIS profession. The findings prove that men are over represented in the whole LIS community.

Keywords: Gender differences; Research productivity; Bibliometrics; Scholarly publishing; DESIDOC Journal of Library & Information Technology; Female authors.

1. INTRODUCTION

Research has become a vital activity in every field of knowledge. Bibliometrics is an emerging thrust area of research in different branches of human knowledge since its inception. It has now become well established art of information research. A quantitative approach to the description of documents and examination of services is gaining ground both in research and practice[1].

Bibliometrics is an approach based on quantitative characteristics, attributes or objects of documentary flows. It is primarily based on the analysis of bibliographic data on publications. A principle assumption underlining the use of bibliometric indicators is that scholars publish their research findings in available literature and that one may obtain pictures of scholarly activities from quantitative analysis of scholarly documents[2].

Numerous studies and data exist from all over the world in scientific fields, analysing male-female publication output. The careful analysis of research contribution in the form of scholarly publication can provide deep insights for making inter-institution, inter-field and international comparison of research performance. There are very few studies undertaken in India which gives an insight to the publishing trend in LIS journal literature with a gender perspective.

2. LITERATURE REVIEW

Numerous studies have been conducted to analyse the publication output of both the gender and their underlying reasons in different parts of the world and in on impact in favour of women.

The gender gap investigated on cross-sectional sample publications and authorships in the field of management research, a marginal difference was found in citation impact in favour of women management scholars[3]. The study conducted on Web of Science (WoS) extracting publication data of Iranian women contributions in the area of science and technology. There was no gender difference found between pure and applied fields of science. The findings emphasised on quality of research to improve female scientific productivity and their citation score[4].

In the discipline of physics 44 women faculties and their 802 publications were studied during the period 2011-2015. The analysis showed that, majority of women authors preferred to be second author in collaborative authorship[5].

The scientific profile of Indian publication output in Life sciences with reference to women revealed that women scientists emphasised on the sub-discipline of cell biology and reproductive biology and male scientists emphasised on the sub-discipline of zoology. Women scientists have few international collaborative papers with less number of citations[6]. The contributions to science was explored from University of Kashmir in terms of gender differences across various disciplines and parameters selected were gender variation, gender repetition, etc[7]. The performance of women in Nano science & Technology using a scientometric method in terms of their scientific productivity and impact were compared. The findings revealed over-representation of males in the field of Nano science & Technology[8].

A study conducted on Iranian women and their international scientific production based on twenty-two broad ISI fields. It

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showed that women are less active in economics, business and space sciences compared to science. Although in respect to quality of research output and level of impact no difference was found[9]. The career prospects for Swedish female professors concluded that women are significantly less likely than men to become professors and this situation has not improved overtime[10]. Gender differences were identified in publication output of Nigerian university librarians. The study revealed that male LIS professionals published more than their female counterparts. The major reason found for low productivity of females was related to family responsibilities[11].

The research community working in the science-technological disciplines of Italian university system was examined to identify the differences between the sexes. The reasons for gender differences in research and its related factors found were e.g., age, maternity, marriage, children and level of specialisation[12]. Gender differences among Iranian researchers' publication activity concluded that females lagged behind in scientific production compared to males[13]. The world's best six multi-disciplinary journals examined female publication output across key disciplines and found no gender difference in Journal Impact Factor ratings, although differences occurred in quality of research discipline-wise rather than due to gender bias[14]. The reasons identified for undertaking comparative studies based on gender were, firstly the assessment of scientific research, is crucial, which is communicated through publications. And secondly, given the gender inequality in academic status, promotions and income, it would be difficult, to evaluate or improve the current situation, without investigating the gender differences and their underlying factors[15].

The participation of women researchers in *The Electronic Library* observed that the results were no different when compared with similar other studies which showed overall increase in male scholarly publication[16].

The LIS research trends found Nigerian authors as the largest contributor in a study carried in Africa, during 1991-2002[17]. The publishing patterns between male and female PhDs in librarianship revealed that women are just as likely to publish as men[18-19].

The review of literature on women's scholarly activity and production, indicates low academic performance of females both in developing as well as developed world with few exceptions.

2.1 Statement of the Problem

Gender differences in terms of scientific productivity need to be monitored in the twenty first century, when the whole world is talking about women empowerment and emancipation. This study examines the position of female researchers against male researchers in the field of LIS in the *DESIDOC Journal of Library & Information Technology* during 2008-2017.

3. OBJECTIVES

The aim of the present investigation is to examine LIS literature with a gender perspective as reflected in the publication output reported during 2008-2017 in *DESIDOC Journal of Library & Information Technology*. The present investigation aims to study the research contributions of both the gender in terms of following sub-objectives

- To determine the rate of growth of LIS literature;
- To focus on LIS trends including topics and cited papers;
- To assess relationship between author productivity and professional engagement;
- To identify different fields in LIS where male and female researchers concentrate;
- To find authorship pattern so as to calculate the level of collaboration from the gender perspective amongst the following five combinations: Male single author; Female single author; Male-Female author; Male-Male author; Female-Female author
- To identify gender distribution in national and international collaboration;
- To ascertain male and female prolific authors;
- To determine citation variation across genders.

3.1 Hypotheses of the Study

H1. There is no difference between research productivity of male and female researchers.

H2. Research productivity of male and female authors is not dependent on their professional status.

H3. Numbers of publications produced in national and international collaboration are independent of the gender of contributing authorship collaborations.

H4. Citedness of articles is independent of the type of gender-wise authorship pattern.

4. RESEARCH METHODOLOGY

The present study applies bibliometric method with a comparative approach, to study contribution of male and female LIS professionals in *DESIDOC Journal of Library & Information Technology* during 2008-2017. Although the journal lists introduction, book reviews etc. only research articles are taken into consideration as research output. The information regarding the respective author's gender and their professional engagements have been taken from the introductory notes provided at the end of the article. Scopus database was consulted on March 2017 and again data was updated on March 2018 to gather information on citations received by the journal articles being studied.

For the purpose of the study first author has been considered as principal author and to analyse different collaborative authorship patterns, first and second authors were studied. The author collaboration was broadly studied under two categories national and international. The first author's affiliation either male/female was identified and assigned the type of institution category, country's name from which the article was contributed and the name of institution was analysed to find out institution productivity as well. Furthermore, the professional status of authors is examined under three categories teaching, non-teaching and research scholar. An author involved in teaching in university is classified as teacher. Non-teacher is involved in the profession as a practicing librarian in research institutions, university library and other information or resource centers. Research scholar engaged as a researcher in university or in a research institution. Subject distribution of authors is also studied.

5. DATA ANALYSIS AND INTERPRETATION

MS Excel was used for analysing the data downloaded. The data as collected was analysed using IBMSPSS20 software. A chi square test was applied to analyse the relationship between male and female contribution, teaching-non-teaching ratio, collaboration etc.

5.1 Yearly Contribution of Authors by Gender

Table 1 reveals the yearly distribution of male and female authors. In total of 532 authors, 401 (75.38 %) researchers are males and 131 (24.62 %) female. Thus, as shown in Table 1, there has been greater proportion of male authors compared to female authors during the study period.

5.2 The Comparison of Male and Female Researchers' Frequencies

A chi-square test performed observed significant difference between male and female research output at 5 % significance level ($x^2 = 137.030$, $p = 0.000$) and that female contributions was significantly lower than male. Hence, the null hypothesis is rejected as shown in Table 2.

5.3 Average Distribution of Authors by Gender

In Table 3, analysis of data shows that average number of male authors per article was 0.75 (AMPP) ranging from a minimum of one to maximum of seven. On the other hand average number of female authors per article was 0.25.

5.4 Most Prolific Male and Female Authors

As shown in Table 4, it was found that of total of 401 male authors, the most productive author is B.M. Gupta with 8 articles ranked first, followed by K.C. Garg and Shri Ram with 6 and 5 articles respectively. As shown in Table 5, of 131 female contributors, Nidhi Sandal, Paramjeet Walia, Pratibha Gokhale and Ritu Gupta are productive authors with 3 publications each and ranked first.

Table 1. Yearly contribution of authors by gender

Year	Author	Male (per cent)	Female (per cent)
2008	48	38 (79.17)	10 (20.83)
2009	49	36 (73.47)	13 (26.53)
2010	45	34 (75.56)	11 (24.44)
2011	53	39 (73.58)	14 (26.42)
2012	63	50 (79.37)	13 (20.63)
2013	60	50 (83.33)	10 (16.67)
2014	60	46 (76.67)	14 (23.33)
2015	52	42 (80.77)	10 (19.23)
2016	45	33 (73.33)	12 (26.67)
2017	57	33 (57.89)	24 (42.11)
Total	532	401 (75.38)	131 (24.62)

Table 2. The Comparison of male and female researchers' frequencies

	Observed N	Expected N	Residual	Test-Statistics
male	401	266.0	135.0	*Chi – square = 137.030*
female	131	266.0	-135.0	*Df = 1*
Total	532			*Asymp Sig.= 0.000*

Table 3. Average distribution of authors by gender

Year	Male	Female	Total	AMPP	AFPP
2008	38	10	48	0.79	0.21
2009	36	13	49	0.73	0.27
2010	34	11	45	0.76	0.24
2011	39	14	53	0.74	0.26
2012	50	13	63	0.79	0.21
2013	50	10	60	0.83	0.17
2014	46	14	60	0.77	0.23
2015	42	10	52	0.81	0.19
2016	33	12	45	0.73	0.27
2017	33	24	57	0.58	0.42
Total	401	131	532	0.75	0.25

Table 4. Most prolific male authors

Author	No. of papers	Rank
B.M. Gupta	13	1
B. Ramesh Babu	6	2
K.C. Garg	6	2
K. Nageswara Rao	5	3
K.P. Singh	5	3
Shri Ram	5	3
M.P. Satija	4	4
Raj Kumar Bhardwaj	4	4
Rajendra Kumbhar	4	4
Ramesh Pandita	4	4
18 Author	3	5
37 Author	2	6
217 Author	1	7

Table 5. Most prolific female authors

Author	Papers	Rank
Nidhi Sandal	3	1
Paramjeet K. Walia	3	1
Pratibha Gokhale	3	1
R.S.R. Varalakshmi	3	1
Ritu Gupta	3	1
14 Author	2	2
88 Author	1	3

5.5 Research Productivity and Gender Wise Professional Engagement

Of the total of 532 authors, most of them (333) belong to non-teaching profession followed by teaching professionals (171) and research scholars (28). As evident from Table 6, as level of significance is less than 5 per cent there exists statistically significant difference in the number of contributions made by male and female authors engaged in different LIS profession ($x^2 = 11.801$, $p = 0.003$). Hence, the null hypothesis is rejected.

5.6 Collaborative Works and Nature of Collaboration in different Authorship Patterns

Table 7, analysed the works produced in national and international collaboration in four different authorship patterns. Of the total 339 works, 307 (90.56 %) works were produced with national collaboration and 32(8.65 %) works resulted from international collaboration. There exists no significant difference between national and international contributions made by different collaborative authors ($x^2 = 1.986$, $p= 0.575$). Hence the null hypothesis is accepted.

5.7 Research Article Distribution by Gender

The data analysis of Table 8 showed that the highest ranked research area in which male authors contributed is Scientometrics with 38 (9.47 %) at first place followed by Bibliometrics 33 (8.22 %). Library Use studies was preferred by 25 (6.23 %) of the authors at third place. Research articles on the subject of Library software and user study ranked fourth and fifth respectively. Table 8b represents the research areas in which females contribute. The first ranked topic being LIS education with 13 (9.92 %) females. The second most preferred topic was Bibliometrics and Library Use studies with 12 (9.16 %) females scored second place and the other two subject areas were Scientometrics 10 (7.63 %) and Library Software with 5 (3.81 %) female researchers in it.

Table 6. Cross tabulation of author gender and professional engagement

Professional engagement		Gender		Total	Test-Statistics
		Female	Male		
Teaching	Count	34	137	171	*Pearson Chi – Square =11.801*
	Expected count	42.1	128.9	171.0	
Non-teaching	Count	83	250	333	
	Expected count	82.0	251.0	333.0	*Df = 2*
Research scholar	Count	14	14	28	
	Expected count	6.9	21.1	28.0	*Asymp.Sig.(2 – sided) = 0.003*
Total	Count	131	401	532	
	Expected count	131.0	401.0	532.0	

Table 7. National and International publication distribution in different authorship patterns

Authorship pattern		Collaboration		Total	Test-statistics
		International	National		
Male-female	Count	5	57	62	*Pearson Chi - Square =1.986*
	Expected Count	5.9	56.1	62.0	
Male-Male	Count	16	178	194	
	Expected Count	18.3	175.7	194.0	*Df = 3*
Female-male	Count	7	49	56	
	Expected Count	5.3	50.7	56.0	
Female-female	Count	4	23	27	
	Expected Count	2.5	24.5	27.0	*Asymp. Sig.(2 – sided) = 0.575*
Total	Count	32	307	339	
	Expected Count	32.0	307.0	339.0	

5.8 Citedness of Works

Till 15 march 2017, 244 articles received minimum one citation each, while 288 articles are yet to be cited. Table 9 shows no significant difference is observed which proves citedness of work does not depend on different authorship patterns ($x^2 = 5.139$, $p = 0.399$). Hence the null hypothesis is accepted.

5.9 Citations to Works

Table 10 shows the average citation per paper is 2.66. A total of 244 articles have received 651 citations in different collaborative authorship patterns.

6. FINDINGS AND CONCLUSIONS

The present study analysed contribution of authors who had published during 2008-2017 in *DESIDOC Journal of Library & Information Technology*- a prestigious open access journal in the field of LIS and it reveals low academic output of females in research compared to males. Over the year's studies in different areas reported similar results. The studies revealed gender gap between male and female scholarly production with underlying reasons[21-22].

Fewer studies are undertaken in the field of LIS which is being considered a female dominated profession. The analyses of the present study are the following

- The yearly distribution of authors by gender during 2008-2017 reveals less representation of females i.e., 131 (24.62 %) compared to males 401 (75.37 %)

Table 8. Research article distribution of male and female

Male			Female		
Subject	**Males**	**Rank**	**Subject**	**Females**	**Rank**
Scientometrics	38	1	LIS education	13	1
Bibliometrics	33	2	Bibliometrics	12	2
Library use studies	25	3	Library Use studies	12	3
Library software	16	4	Scientometrics	10	4
User study	18	5	Library Softwares	5	5
Open access	6	6	e-learning	4	6
E-learning	5	7	Open access	3	7
Information literacy	5	7	Information literacy	2	8
Digital preservation	3	8	Online exhibitions	2	8
Online exhibitions	3	8			
Other subjects	242		Other subjects	71	

Table 9. Citedness of articles

Authorship pattern	Number of articles		Total	Test-statistics
	Cited	Uncited		
Male	71	75	146	*Pearson Chi – Square = 5.139*
Male-Female	28	31	59	
Male-Male	94	98	192	*Df = 5*
Female	18	26	44	
Female-Male	22	39	61	*Asymp. Sig.(2 – sided) = 0.399*
Female-Female	11	19	30	
Total	244	288	532	

Table 10. Citations to works

Authorship pattern	Citations	Papers	ACPP
Male	222	71	3.12
Male-Female	59	28	2.1
Male-Male	236	94	2.51
Female	40	18	2.22
Female-Male	44	22	2.00
Female-Female	50	11	4.54
Total	651	244	2.66

of total 532 authors.

- A chi-square test performed to check male and female researcher's frequencies shows significant difference between male and female research output ($x^2 = 137.030$, $p = 0.000$). Hence, the null hypothesis is rejected.
- Average number of male authors per article is 0.75 whereas average number of female per article is 0.25.
- B.M. Gupta is the most prolific male author and Nidhi Sandal along with Paramjeet Kaur Walia, Pratibha Gokhale and Ritu Gupta are the most prolific female authors.
- A chi-square test value of ($x^2 = 11.801$, $p = 0.003$) reveals no statistical significant difference in the number of contributions made by male and female authors from different LIS profession.
- Regarding male-female collaborative works it is observed that the value of ($x^2A = 1.986$, $p = 0.575$) proves that there is no significant difference observed in number of national and international publications produced in different collaborative patterns of authorship. Hence the null hypothesis is accepted.
- Male authors preferred to write on the research area of Scientometrics with 38 (9.47 %) followed by Bibliometrics 33 (8.22 %) and Use studies 25 (6.23 %).The female research area of interest for LIS have been LIS education with 13 (9.92 %) females and at second and third place are topics named Bibliometrics and use studies with 12 (9.16 %) and scientometrics with 10 (7.63 %) of females contributors.
- Of total 532 works, 244 received one citation as minimum number, while 288 articles are yet to be cited. No significant difference ($x^2 = 5.139$, $p = 0.399$) is observed in the number of cited or uncited articles produced in different authorship combinations. Hence, the null hypothesis is accepted.
- 244 papers received 651 citations with 2.66 average citation per paper.

It is difficult to understand gender bias and its related causes which are related to gender equity in research productivity across disciplines in different parts of the world[23]. According to more recent research results analysed women's scientific production has increased in quantitative terms in some disciplines though differences exists in overall representation of women in academia[24-25]. Although there is growing participation of women in research and academic activities in the western world, but equal status across gender is still a distant dream[26].

The results of the present study shows that males outperform females in the LIS publication output of DESIDOC Journal of Library & Information Technology during the studied period. Further research is required to understand the issues that hamper academic women research productivity in the field of Library and Information Science.

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