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Indian Journal of Animal Nutrition

Google Scholar's Impact on IJAN
Kumar et al.

The Impact of Google Scholar on the Indian Journal of Animal Nutrition

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ABSTRACT

Between 1985 and 2021, a Scientometric study of the Indian Journal of Animal Nutrition (IJAN) was conducted using the Publish or Perish (PoP) software platform. (37 Years). The impact of IJAN on current scholarship was determined by mining raw data from Google Scholar and applying 19 citation indicators to it. Zipf's Law examined annual contributions, authorship patterns, and author productivity trends in 940 scholarly publications. IJAN's relative growth rate and doubling time were also examined during the study period. According to our information, the year 2003 saw the most publications (38, or 4.04% of the total). The averaged impact rankings of IJAN that were examined are as follows. The present study was based on data from, Indexes (h and g), h-index, g-index, papers, citations, years, citations year, citations paper, citations author, papers author, authors paper, and so on. Index (hc), index (hi), index (hi,norm), index (aw), index (aw), index (aw), index (aw), index (aw), index (aw), index (aw), index (aw), index (aw), index (aw), Authors worked together at a rate of 0.99%. (Out of a maximum of 1). The study recommends a group practice of journal and author productivity using Zipf's Law for a more qualitative evaluation of research impact and academic output.

Keywords: Doubling Time, Indian Journal of Animal Nutrition, Relative Growth Rate Scientometric study, Zipf's Law.

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INTRODUCTION

We analyzed IJAN (Indian Journal of Animal Nutrition) impact summaries. 940 papers and articles were found using Google Scholar. Citations measure how often an article is cited in another publication (7506). Publication years date journals (37 years, from 1985 to 2021). Cites year is the number of times an article is cited in a given year (202.86). Cited paper is the total citations multiplied by the paper count (8.07). Cites Author represents an author's average citations (2670.48). Papers Author shows each author's median publication count (328.77). Authors Paper calculates the number per paper (3.19). Hirsch (2005)'s author-level h-Index was 27 in the current study. Egghe. (2006) g-Index (a g-index of 10 means an author's top 10 publications have been cited at least 100 times), 37 in the current study. The hc index in this study is 13. Modern h-index that devalues older citations (Batista et al., 2006). This study's hi-index, 8.48, reduces co-authorship by dividing the standard h-index by the average number of authors. Hi, individual h index also uses norm Index. Norm normalizes each paper's citations by dividing its sources by its authors. Norm accounts for co-authorship effects, while h index measures per-author impact. (Jin, 2007) Average paper citation age determines AWCR's overall citation count. Newer papers with fewer citations can be included in the AWCR. If the average citation rate remains constant, the AW-index is similar to the h-index. Authorship normalizes age-weighted citation rate per author index. The e-index is the cube root of the number of h-set citations greater than h_2; the minimum needed for an h-index of 'h', the e-index differentiates researchers with similar h-indices and citation patterns. Index Schreiber's method counts fractional papers instead of reducing citation counts and using effective rank.

Sankar and Kavitha (2016) published 13 volumes, 38 issues, and 160 research articles to assess finance management science research output between 2002 and 2014.Ming-Yueh Tsay (2008) analyzed citations to and from the Journal of the American Society for Information Science and Technology (JASIST) to better understand its fields' interconnectedness. In 25 years, the number of JASIST articles doubled and the average number of references per paper tripled. Anyi et al. (2009) included 82 studies using bibliometrics to analyze a single journal between 1998 and 2008. The Indian Journal of Animal Nutrition published research papers on animal nutrition, feed technology, feed evolution and conservation, physiological and biochemical aspects including microbiology, biotechnology, feed fodders technology transfer, economic extension, and related issues (Animal Nutrition Society of India, 2022). Subject matter experts' peer-review journal articles before publication. This study tracked the Indian Journal of Animal Nutrition (IJAN) and its contributors' research from 1985 to 2021. (37). The objectives are to analyze citation metrics to determine how much of an impact IJAN has on publication volume, Check the annual breakdown of how often and what each author writes, find articles published in a certain year by a specific author, a specific group of authors, or a combination of the two, Zipf's Law applies to an author's research output in IJAN, so we can use this information to calculate the RGR and the median time it takes for article views to double during the time period.

MATERIALS AND METHODS

The articles published in the Indian Journal of Animal Nutrition, archived online in Polish or Perish (Harzing.com, 2022) and spanning the years 1985 to 2021, provide the majority of the data used in this analysis (37 years). PoP is a Microsoft Windows programme that, with the aid of an appropriate emulator, can retrieve and examine scholarly citations on other platforms, such as OSX (Macintosh Operating System) and Linux OS. The raw citations for metric analysis are obtained from Google Scholar (2022). The majority of the 940 articles included in the examination were research articles, brief communications, reviews, and case studies. The collected data was then compiled, tabulated, analyzed, and visually presented in the form of tables and graphs for further examination and discussion. Table 1 provides some metrics for the Indian Journal of Animal Nutrition, including the number of papers published, the number of citations received, the number of authors and more.

Table 1.Impact of Indian Journal of Animal Nutrition

Query	Indian Journal of Animal Nutrition
Source	Google Scholar
Papers	940
Citations	7506
Years	37
Cites_Year	202.86
Cites_Paper	8.07
Cites_Author	2670.48
Papers_Author	328.77
Authors_Paper	3.19
h_index	27
g_index	37
hc_index	13
h_i_index	8.48
h_i_norm	14
AWCR	538.95
AW_index	23.22
AWCRpA	177.85
e_index	20.25
hm_index	19.43

RESULTS AND DISCUSSION

Figure 1 demonstrates that the bulk of publications in the Indian Journal of Animal Nutrition was published in 2003, accounting for 4.04% (38) of the total, followed by 3.94% (37) in 2015 and 1.06 % in 1992.

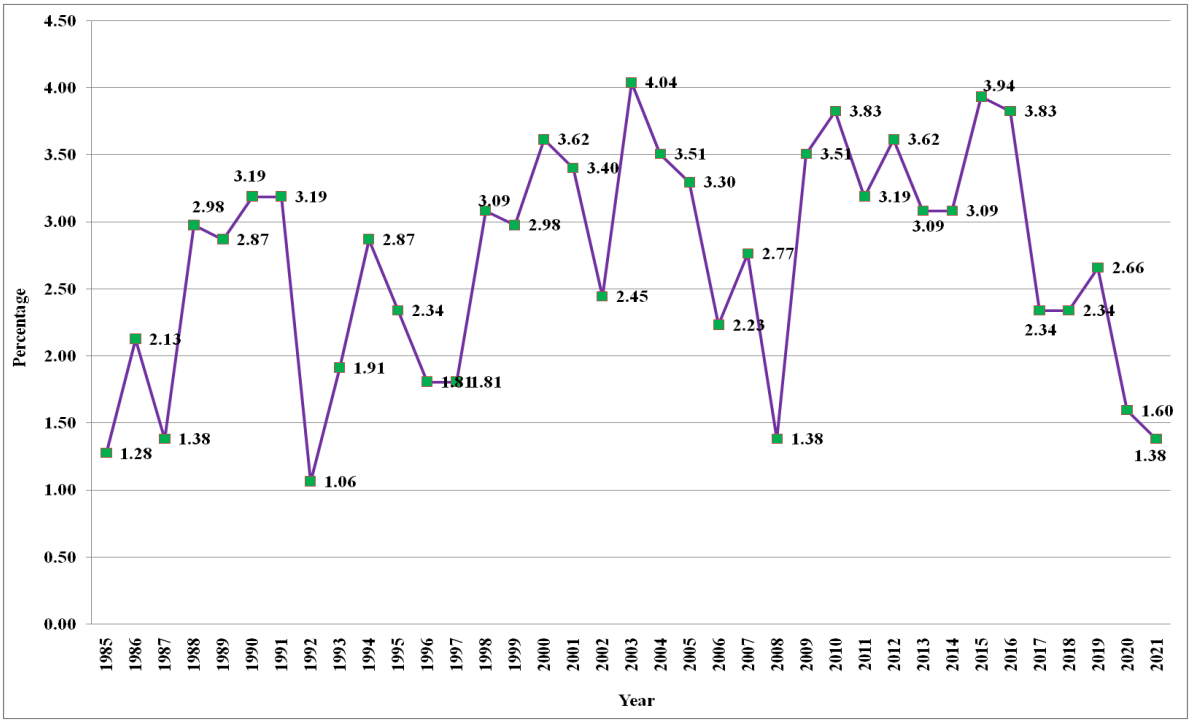

Figure 1: Growth of Year-wise Article in IJAN

Relative Growth Rate (RGR) is utilized to determine an increase in the number of articles or pages per unit of time. The following equation can be used to determine the average Relative Growth Rate over a specific interval.(Hunt and Cornelissen, 1997).

$$\text{Relative Growth Rate (RGR)} = \frac{\text{Log}X_e W_2 - \text{Log}X_e W_1}{T_2 - T_1}$$

RGR = Mean relative growth rate over the period.

$\text{Log}X_e W_1$ = Initial article log.

$\text{Log}X_e W_2$ = Final article count in a given interval.

$T_2 - T_1$ = Initial-to-final time difference.

Calculating RGR uses this study year.

Doubling Time (DT)

RGR and Doubling Time (DT) indicate the time needed to double publication volume. Exponential growth uses doubling time. Calculating Doubling Time:

$$DT = \{(t_2 - t_1)\log(2)\big/(logc_2 - logc_1).$$

Again, in the per year growth case, the expression for Doubling Time can be written as: Doubling Time $= \frac{\log(2)}{RGR}$. The data relating to the growing output of the Indian Journal of Animal Nutrition has been presented in Table 2. To calculate the mean RGR and mean DT, the study period (1985-2021) has been divided into two block periods, i.e. 1985-2002 and 2003-2021. The quantum output of the Indian Journal of Animal Nutrition has increased from 12 in 1985 to 23 in 2021; however, research publication was found to be maximum in 2003with 38 publications. It is further observed that the mean Relative Growth Rate increased from 1.93303 in the first block to 3.049015in the second block. On the other hand, the mean Double Time decreased from 0.40173 in the first block to -17.0142in the second block. In addition, the Relative Growth Rate increased from 0.470004 in the year 1986 to 2.897592 in the year 2002; correspondingly, Double Time gradually decreased from 1.474669 to 0.239199 in the same period.

Table 2.Relative Growth Rate and Doubling Time of Indian Journal of Animal Nutrition

Year	Quantum of Output	Cumulative total output	$LogX_eW_1$	$LogX_eW_2$	RGR	Block Period	Double time	Block Period
1985	12	12	2.4849	2.4849	0		0	
1986	20	32	2.9957	3.4657	0.470004		1.474669	
1987	13	45	2.5649	3.8067	1.241713		0.55818	
1988	28	73	3.3322	4.2905	0.958255		0.723294	
1989	27	100	3.2958	4.6052	1.309333		0.529353	
1990	30	130	3.4012	4.8675	1.466337		0.472674	
1991	30	160	3.4012	5.0752	1.673976		0.414044	
1992	10	170	2.3026	5.1358	2.833213		0.244634	
1993	18	188	2.8904	5.2364	2.34607	1.93303	0.29543	0.40173
1994	27	215	3.2958	5.3706	2.074801		0.334056	
1995	22	237	3.0910	5.4681	2.377018		0.291584	
1996	17	254	2.8332	5.5373	2.704121		0.256313	
1997	17	271	2.8332	5.6021	2.768905		0.250316	
1998	29	300	3.3673	5.7038	2.336487		0.296642	
1999	28	328	3.3322	5.7930	2.460809		0.281655	
2000	34	362	3.5264	5.8916	2.365284		0.29303	
2001	32	394	3.4657	5.9764	2.510615		0.276068	
2002	23	417	3.1355	6.0331	2.897592		0.239199	
2003	38	455	3.6376	6.1203	2.482711		0.279171	
2004	33	488	3.4965	6.1903	2.693808		0.257294	
2005	31	519	3.4340	6.2519	2.817917		0.245962	
2006	21	540	3.0445	6.2916	3.247047		0.213456	
2007	26	566	3.2581	6.3386	3.080498		0.224996	
2008	13	579	2.5649	6.3613	3.796353		0.18257	
2009	33	612	3.4965	6.4167	2.920225		0.237345	
2010	36	648	3.5835	6.4739	2.890372		0.239796	
2011	30	678	3.4012	6.5191	3.11795		0.222294	
2012	34	712	3.5264	6.5681	3.041717	3.049015	0.227865	-17.0142
2013	29	741	3.3673	6.6080	3.240705		0.213873	
2014	29	770	3.3673	6.6464	3.279095		0.211369	
2015	37	807	3.6109	6.6933	3.082406		0.224857	
2016	36	843	3.5835	6.7370	3.153448		0.219791	
2017	22	865	3.0910	6.7627	3.671687		0.188769	
2018	22	887	3.0910	6.7878	3.696803		0.187486	
2019	25	912	3.2189	6.8156	3.596764		0.192701	
2020	15	927	2.7081	6.8320	4.123903		0.168069	
2021	13	940	2.5649	6.8459	-0.00212		-327.208	

Authorship Pattern in Indian Journal of Animal Nutrition

Table 3 presents the authorship trend in papers in the Indian Journal of Animal Nutrition. There are 940 articles written by 2965 authors, both single and multi-authored. The table shows that 1312 (44.25%)

authors published in 2016, with the majority of 72 authors. In 1990, 837 (28.23%) authors published three authored and 54 authors, while in 2001, 472 (15.92 %) two authors published 28 authors.

Table 3. Authorship Pattern in Indian Journal of Animal Nutrition

S. No	Year	Single	Two	Three	Four	Five and above	Total	Percentages
1	1985	2	12	6	8	0	28	0.94
2	1986	3	18	15	12	0	48	1.62
3	1987	0	12	12	8	5	37	1.25
4	1988	0	18	42	20	0	80	2.70
5	1989	1	16	27	36	0	80	2.70
6	1990	0	14	54	20	0	88	2.97
7	1991	1	16	27	8	0	52	1.75
8	1992	0	8	15	4	0	27	0.91
9	1993	0	12	21	20	0	53	1.79
10	1994	1	18	30	28	0	77	2.60
11	1995	0	22	15	20	5	62	2.09
12	1996	1	8	18	24	0	51	1.72
13	1997	0	16	18	12	0	46	1.55
14	1998	1	22	21	36	5	85	2.87
15	1999	2	18	27	32	0	79	2.66
16	2000	0	26	42	24	5	97	3.27
17	2001	0	28	39	20	0	87	2.93
18	2002	1	12	24	28	5	70	2.36
19	2003	2	24	24	60	5	115	3.88
20	2004	0	14	39	52	0	105	3.54
21	2005	0	12	36	48	5	101	3.41
22	2006	0	16	21	24	0	61	2.06
23	2007	0	10	36	36	0	82	2.77
24	2008	0	10	6	20	5	41	1.38
25	2009	0	14	30	52	15	111	3.74
26	2010	1	14	36	64	0	115	3.88
27	2011	0	14	15	64	10	103	3.47
28	2012	1	10	33	60	10	114	3.84
29	2013	1	10	15	64	10	100	3.37
30	2014	0	2	24	72	10	108	3.64
31	2015	0	8	24	48	65	145	4.89
32	2016	0	6	18	72	45	141	4.76
33	2017	0	2	12	48	25	87	2.93
34	2018	2	4	6	44	25	81	2.73
35	2019	0	0	3	60	45	108	3.64
36	2020	2	6	3	28	10	49	1.65
37	2021	1	0	3	36	11	51	1.72
Total		23	472	837	1312	321	2965	100.00
Percentages		0.78	15.92	28.23	44.25	10.83	100.00	

Authors' Collaboration in Indian Journal of Animal Nutrition

In this study,

where Degree of Collaboration $\boldsymbol{C = \frac{Nm}{Nm + Ns}}$

Ns = *Total Number of Single Authors*

Nm = Total Number of Multiple Authors

C=Degree of Collaboration

C= 2942/2942+23 = 0.99%

As a result, the Collaboration C degree is 0.99%. During the study period, statistics on the degree of collaboration between single and multi-authored research are shown in Table 4. A total of 23 single authors contributed to 940 research publications, while numerous authors submitted 2942.

Table 4. Degree of Collaboration during the study period in the Indian Journal of Animal Nutrition

S. No	Single Authors (Ns)	Multiple Authors (Nm)	Total	Degree of Collaboration
1	2	26	28	0.93
2	3	45	48	0.94
3	0	37	37	1.00
4	0	80	80	1.00
5	1	79	80	0.99
6	0	88	88	1.00
7	1	51	52	0.98
8	0	27	27	1.00
9	0	53	53	1.00
10	1	76	77	0.99
11	0	62	62	1.00
12	1	50	51	0.98
13	0	46	46	1.00
14	1	84	85	0.99
15	2	77	79	0.97
16	0	97	97	1.00
17	0	87	87	1.00
18	1	69	70	0.99
19	2	113	115	0.98
20	0	105	105	1.00
21	0	101	101	1.00
22	0	61	61	1.00
23	0	82	82	1.00
24	0	41	41	1.00
25	0	111	111	1.00
26	1	114	115	0.99
27	0	103	103	1.00
28	1	113	114	0.99
29	1	99	100	0.99
30	0	108	108	1.00
31	0	145	145	1.00
32	0	141	141	1.00
33	0	87	87	1.00
34	2	79	81	0.98
35	0	108	108	1.00
36	2	47	49	0.96
37	1	50	51	0.98
Total	23	2942	2965	0.99

Number of Citation per Article in the Indian Journal of Animal Nutrition

Table 5 shows citations per article statistics. The table shows that almost 409 (5.45%) citations were received for articles in 2003, followed by 377 (5.02%) citations in 2015 and 371 (4.94%) citations in 2009. However, according to DeGroote, (2022), the process of assessing an article's impact or "quality" by counting the number of times other authors mention it in their work. According to Ahmed et al., (2016), citation metrics and total publications in a field have become the gold standard for rating researchers and field viability.

Table 5. Number of Documents Vs Number of Citations

S.No	Year	Documents	Percentages	Citations	Percentages
1	1985	12	1.28	88	1.17
2	1986	20	2.13	130	1.73
3	1987	13	1.38	134	1.79
4	1988	28	2.98	257	3.42
5	1989	27	2.87	209	2.78
6	1990	30	3.19	229	3.05
7	1991	30	3.19	245	3.26
8	1992	10	1.06	68	0.91
9	1993	18	1.91	136	1.81
10	1994	27	2.87	215	2.86
11	1995	22	2.34	163	2.17
12	1996	17	1.81	143	1.91
13	1997	17	1.81	128	1.71
14	1998	29	3.09	269	3.58
15	1999	28	2.98	228	3.04
16	2000	34	3.62	294	3.92
17	2001	32	3.40	308	4.10
18	2002	23	2.45	226	3.01
19	2003	38	4.04	409	5.45
20	2004	33	3.51	323	4.30
21	2005	31	3.30	246	3.28
22	2006	21	2.23	254	3.38
23	2007	26	2.77	183	2.44
24	2008	13	1.38	76	1.01
25	2009	33	3.51	371	4.94
26	2010	36	3.83	324	4.32
27	2011	30	3.19	218	2.90
28	2012	34	3.62	289	3.85
29	2013	29	3.09	202	2.69
30	2014	29	3.09	278	3.70
31	2015	37	3.94	377	5.02
32	2016	36	3.83	226	3.01
33	2017	22	2.34	108	1.44
34	2018	22	2.34	81	1.08
35	2019	25	2.66	56	0.75
36	2020	15	1.60	15	0.20
37	2021	13	1.38	0	0.00
Total		940	100.00	7506	100.00

Authors Rank in Zipf's Law Derivation

Zipf's Law is a reflection-based statement rather than a concept-based statement. Many sorts of data analyzed in Natural and Social science can be characterized by a Zipf distribution, a discrete probability distribution, according to Zipf's Law, which was defined using mathematical statistics(George K, 1950). If all unique words in a text are organized (or ranked) in decreasing frequency of occurrence, the product of frequency time's rank provides a roughly identical constant for all terms in the text, according to Zipf. Assume that a word appears a particular number of times and that its rank in the list of word frequencies is r. Then if Zipf's Law holds (for all terms)$f = a/rb$where a and b are constants and b is close to 1(Hermetic, 2022), Zipf's Law then predicts that out of a population of N elements, the frequency of elements of rank k, f (k; s, N), is:

$$(k, s, N) = 1/ks \sum \left(\frac{1}{ns}\right) Nn = 1$$

N : be the number of elements;

K : be their rank;

S : be the value of the exponent characterizing the distribution

Figure 2 shows a study published in the Indian Journal of Animal Nutrition to determine the validity of Zipf's Law, which gives a rank frequency distribution in data sets such as author's names. The graph (Figure.2) shows the ranked distribution of authors' names related to the number of publications searched through Google using IJAN. Out of a total of 1048 names, "Singh" (142) is the most frequent, followed by "Reddy" (114). The terms "Kumar, Gupta, Rao" appear 92, 62, and 50 times. Despite applying Zipf's Law, specific errors have been observed in this study. The reasons for these errors are the author's name 'Singh' is a surname in the Indian context. The first and middle names of the author are written as initials in capital letters, for instance, S.K.Singh, and M.R.Singh etc. This error can partially be corrected by writing the first and middle names of the author in full, for example, 'Sanjay Kumar Singh'. However, there still can exist two different authors with the same name, viz., 'Sanjay Kumar Singh'. The ORCID number of individual authors may be quoted to eliminate this error. The ORCID(2022) number means Open Researcher and Contributor ID, a nonproprietary alphanumeric code that uniquely identifies authors and contributors. The most authentic feature of ORCID is it asks for the author's email ID. An author cannot have two email IDs within the same email service provider. Only one email ID is accepted for ORCID registration, so there is an error in the authors' names. Further results generated from PoP software correlate positively with the corresponding results of Zipf's Law.

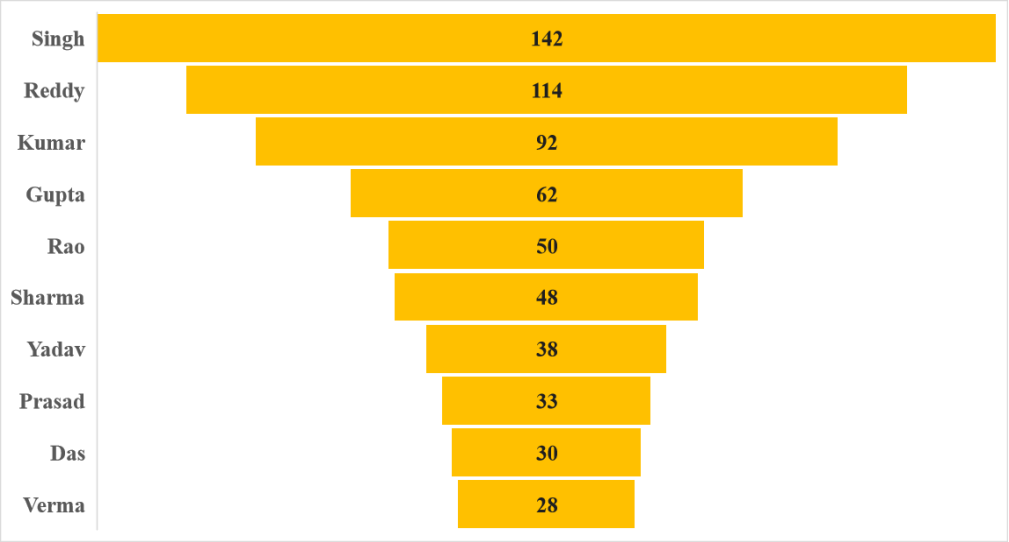

Figure 2. Funnel Plot for Ranking of Authors

CONCLUSION

This study has the potential to pave the way for additional research into the effectiveness of academic research publications and their authors. More research needs to be done to determine the scope of work, the distribution of authors across areas of study, and the frequency of co-authorship. A study like this would lay the groundwork for similar investigations in the future. On the NAAS scale, the research and analysis articles published in the Indian Journal of Animal Nutrition between 1985 and 2021 earned a 5.66. The data reveals that in 2003, the Indian Journal of Animal Nutrition published 4.54 percent of its total body of work. For the purposes of determining RGR and DT, the study period was split into two halves: 1985-2002 and 2003-2021. Research publication peaked in 2003 with 38 articles appearing in Indian Journal of

Animal Nutrition. From 1.93303 to 3.049015, the average RGR was up. The average double-time interval dropped from 0.40173 to -17.0142. Double Time decreased from 1.474669 in 1986 to 0.239199 in 2002, while the Relative Growth Rate increased. There were only 23 unique authors across 940 total studies, but many more were involved across 2,942. The report discusses the growth of IJAN, as well as citation rates, authors, degrees of collaboration, and Zipf's Law for author productivity. The editor is tasked with conducting a single impact journal study, the findings of which will determine the journal's and its management's long-term viability and direction. Misidentification is decreased with ORCID. There are a lot of researchers with the same or very similar names, so it's easy to get them mixed up. This is especially the case if the researchers have gone through a name change or have employed alternate spellings or transliterations of their given name. If one uses their own ORCID ID, that person's identity can't be misrepresented. As a result, it is crucial to inform authors about the benefits of creating an ORCID profile. Moreover, authors who make contributions may be asked to provide their ORCID identifiers.

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