

Authorship Structure of Scholarly Disciplines: An Application of Lotka's Law to Philippine Research Journals in the Social Sciences*

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Abstract

This study was conducted to find out whether Lotka's law of scientific productivity applies to selected Filipiniana social science journals. Authorship was also delved into.

Introduction

Social science research is part of a culture which has its own philosophical theory of knowledge. Social science knowledge creates an image of society and the social activities in that society. Thinking and writing about one's society requires a frequent construction, deconstruction, and reconstruction of society. These processes of reflection on society are important in the development of society, whether these reflections are done by scholars and intellectuals within or outside that society. The measurement of knowledge production faces many problems especially when it is not published or made available to a wider public (Gerke & Evers, 2006). There has been an increase in the output of Southeast Asian Social scientists in the past forty years. According to Gerke and Evers (2006) this means that as far as the social sciences are concerned, the epistemic culture of Southeast Asia is quite strong. ASEAN research has been stratified into two classes, the upper and lower. The Philippines belongs to the upper class, along with Singapore, Brunei, and Malaysia. The countries in this class show that they have a large global knowledge base. Furthermore, according to Gerke and Evers (2006), the Philippines is the most researched country in Southeast Asia. However, they also point out that several factors may be involved in the production of knowledge through time, such as personal preferences of authors, officials of funding organizations, government agencies, and different political systems.

*Based on the author's Master of Library and Information Science Thesis, UP School of Library and Information Studies, April 2006.

Dela Torre, N. N. (2008). Authorship Structure of Scholarly Disciplines: An Application of Lotka's Law to Philippine Research Journals in the Social Sciences. *Philippine Journal of Librarianship*, 28 (1), 32-54.

This paper is a study of the authorship characteristics in the Philippines. A study of authorship characteristics would include the number of articles produced by the authors, a ranking of the most prolific authors in the field, an identification of the authors' gender, the extent of collaboration with other authors, institutional affiliations and occupations, the topic of the articles, geographic locations of the authors, collaboration with regional and international authors, cited references, and other relevant characteristics (Park, 2007). This study concentrates on the number of articles produced and contributed by authors in journals as well as an identification of their gender.

Bibliometrics is one method used to determine the status of authorship in the Philippines as far as social science is concerned. It is a field in information science which is used to “develop and provide tools to be applied to research evaluation” (Glänzel, 2006?). One method in bibliometrics is the application of Lotka's Law. Alfred Lotka was an Austrian chemist, demographer, ecologist, and mathematician who started the study on frequency distribution of scientific productivity (Rousseau, 2006?).

Lotka's Law describes the frequency of publication by authors in a given field. It states that

... the number (of authors) making n contributions is about

$\frac{1}{n^2}$ of those making one; and the proportion of all contributors, that make a single contribution, is about 60 percent (Lotka, 1926, cited in Potter 1988). This means that out of all the authors in a given field, 60 percent will have just one publication, 15 percent will have two

publications ($\frac{1}{2^2} \times .60$), 7 percent of authors will have three

publications ($\frac{1}{3^2} \times .60$), and so on. According to Lotka's

Law of scientific productivity, only six percent of the authors in a field will produce more than 10 articles. Lotka's Law, when applied to large bodies of literature over a fairly long period of time, can be accurate in general, but not statistically exact. It is often used to estimate the frequency

with which authors will appear in an online catalog (Potter, 1988, in *Bibliometrics*).

This study tries to find out the authorship patterns in scholarly Philippine social science journals using Lotka's Law.

1. To determine the authorship structure in research journals in the scholarly Philippine social science journals;
2. To find out the frequency of authorship in the discipline and the gender patterns of the authors; and
3. To prove or disprove Lotka's Law, which is, "a small number of authors are disproportionately responsible for a large amount of literature."

The application of Lotka's Law to journals will help us identify the characteristics of authors in different social science subjects in the Philippines and the patterns of authorship as well as establish a paradigm in publications. Further study may be done to help improve publication strategies in journals and help prospective authors increase their chance of getting published.

This study focuses on the following Philippine research journals in the social sciences:

1. *Asian Studies*
2. *Education Quarterly*
3. *Journal of History*
4. *Journal of Philippine Librarianship*
5. *Philippine Journal of Psychology*
6. *Philippine Journal of Public Administration*
7. *Philippine Law Journal*
8. *Philippine Political Science Journal*
9. *Philippine Review of Economics*
10. *Philippine Sociological Review*

These are the only journals that meet all or most of the characteristics of scholarly or research journals. The term scholarly journals, which is synonymous with refereed or peer reviewed journals, undergo evaluation by experts in the field. The articles are skillfully edited before these are finally approved and deemed ready for publication. These report on findings of research in a given discipline to inform the members of the "scholarly community" ([Buswell Memorial Library, 2005](#)). These journals may also contain review articles that summarize the current state of

knowledge on a topic (University of Nebraska, 2008). The articles in scholarly journals are written for specialists, researchers, and students and not for the general public. The writers of the articles are specialists in the discipline. Most of them are professors in colleges, universities, or research institutes who usually contribute articles without any compensation. The author(s) cite the sources as footnotes, endnotes, or bibliographies ([Buswell Memorial Library, 2005](#)). If the journal contains advertisements, these are information which are of interest to the journal's specific readers (Simon Fraser University Library, 2008). These contain formal presentation of primary sources of information or research which discuss new ideas. The articles are written in such a way that these provide background information about the topic, significance of the study, methodology, and results/interpretation. Scholarly journals appear in a format with more charts and tables rather than photographs (Simon Fraser University Library, 2008).

A second limitation of this study is to include only those journals with complete issues or volumes.

In Pao's 1985 study about Lotka's Law, "the number of authors, y_x , each credited with x number of papers, is inversely proportional to x^n , which is the output of each individual author" $x^n * y_x = c$ where y_x is the number of authors making x contributions to the subject, and n and c are the two constants to be estimated for the specific set of data. Lotka's often quoted conclusion is:

In the cases examined, it is found that the number of persons making 2 contributions is about one-fourth of those making one; the number making 3 contributions is about one-ninth, etc; the number making n contributions is about $\frac{1}{n^2}$ of those making one; and the proportion, of all contributors, that make a single contribution, is about 60 percent (Drake, v. 1, pp. 297-298).

Rousseau's study (1992) analyzed bibliographies in a review paper and in a book. It studied citations of authors in the article, *Statistical Methods in Information Science Research* which contained 145 items having 22 different authors or co-authors from journals, conferences, or books; and the book *Introduction to Infometrics* which contains 618 items by 554 different authors. The purpose of the study is to prove or disprove the robustness property of Lotka's Law, which theorizes that "if one finds a Lotka distribution for one method of *Authorship Structure of Scholarly Disciplines*

counting, one also finds a Lotka distribution for any other method.” Applying normal counts to the two bibliographies yields a Lotka function while adjusted counts do not return Lotka distributions. Rousseau also points out that, ...for authors with a low fractional count, it is almost sure that they have published exactly one paper (using normal counts), while for authors with a high fractional count the total number of papers of which they are an author is a true stochastic variable.

Since this is the case, this study gives full credit to each contributor and does not use adjusted counts.

Steynberg and Rossouw (1995) identified the quantitative characteristics of authorship of South African researchers based on authors, citations, number of pages of articles, and references. The authors of this study found out that there are fewer researchers and there is lesser collaboration among researchers in the biomedical field. The authors attributed this phenomenon to geographic factor, discouragement of personal contact, academic boycott and a decline of support for research in the field. However, an increase in the number of authors per publication can still be seen, though somewhat slow. This finding is in contrast with the findings of a study by Sampson (1995), which measured the number of authors per article in a scientific periodical for over 40 years. The results of Sampson’s study revealed that there is a decrease in single authored articles. The growth in multiple authorship is attributed to the increasing complexity of science.

Lotka’s distribution has been resilient to nuances such as used time interval, varying rates of production, and different counting procedures (Kretschmer and Rousseau, 2001).

In the field of social science, Kabir (1995) examined patterns of authorship, degree of collaboration, distribution of publication by date, language and form of publication, subject areas studied, and authors’ preferences for periodicals of publication on the subject of bibliometrics based on entries in *Library and Information Science Abstracts (LISA)* from 1964 to 1990. The study revealed that 65 percent of the articles that were analyzed were of single authorship and the degree of collaboration ranged from 0.20 to 0.35.

Haan’s study (1997) examined patterns of authorship in Dutch sociology from 1939 to 1987 and found out that although there is an increase in collaboration, most publications are still of single authorship.

O'Neill's study (1998) examined patterns of authorship in the *Educational Theory Journal* from 1955 to 1994 and in the *Journal of Educational Thought* from 1970 to 1994. Similar to Haan's study, O'Neill's findings revealed that most authorship in both journals were single regardless of the date of publication. This is a challenge to the prediction that co- and multiple authorships would be the trend in the future.

Co-authorship has increased predominantly as found out by the study of Cronin, Shaw, and LaBarre (2003) which analyzed 4500 articles in *Psychological Review* and *Mind*. The researchers found out that as the decades went on, the number of co-authored works increased significantly. However, co-authorship is more prevalent in psychology than in philosophy. This may be due to the fact that philosophers "wrestle much of the time, privately, with abstract issues and theories, not with problems, subjects, trends, and data located in the real world".

Zamora and Adamson's (1982) study focused on *Special Libraries* and four other library science journals. Sen, Taib, and Hassan (1996) tested whether Lotka's Law would also apply to the Name Index of *LISA* for 1992 and 1993. Siddiqui (1997) did a bibliometric study on the authorship characteristics in *Journal of the American Society for Information Science, Information Technology and Libraries, Journal of Information Science, and Program*. Al-Ghamdi and his fellow researchers (1998) tried to discover trends in authorship in *JASIS* for a 27-year period from 1970 to 1996. Hawkins (2001) applied bibliometrics to information science e-journals found in the *ISA* database records, since the *ISA* is the only database which included all 28 journals under study. Okiy's (2003) study analyzed the characteristics of Nigerian authors who contributed between 1994-2000 in *African Journal of Library, Archives, and Information Science (AJLAIS)*, *Nigerian Libraries*, *Lagos Librarian*, and the *Nigerian Library and Information Science Review*.

Most of the findings reveal that Lotka's Law also applies to the library and information science field. There is an imbalance in favor of male authors in most of the journals that were included in the studies.

This paper also deals with authorship in scholarly journals in social science but with a focus on selected Philippine publications. This study will not discuss collaborations between authors, the number of pages of the articles, citations, language and form of publication, the subject areas studied, and authors' preferences for periodicals of publication. It will focus on the number of contributions of the authors and the gender of the contributors.

Theoretical Framework

Bibliometrics is an application that is used to determine the history and trends in authorship, publications, and almost everything that characterizes the literature (ALA Glossary of Library and Information Science, 1983). It entails the application of mathematical and statistical methods to quantify the use of books and other forms of media in libraries or library systems. Lotka's Law specifically studies scientific productivity of authors. Although it was originally intended for statistical measurement of authors who contribute in chemistry and physics only, the literature cited in this study prove that this method can also be used to measure authorship productivity in other fields.

Bibliometric method was applied to selected Philippine social science journal publications to find out trends and patterns in authorship.

Methodology

The serials collections of the University of the Philippines Main Library, the unit libraries, some departments in specific colleges, The National Library, the Rizal Library of Ateneo de Manila University, and the Philippine Social Science Council were utilized to gather all the issues and volumes of the selected titles because these libraries and institutions more or less have complete volumes of the journals that were included in this study.

The following journals were selected to represent subjects in the Social Sciences: *Asian Studies*, *Education Quarterly*, *Journal of History*, *Journal of Philippine Librarianship*, *Philippine Journal of Psychology*, *Philippine Journal of Public Administration*, *Philippine Law Journal*, *Philippine Political Science Journal*, *Philippine Review of Economics*, and *Philippine Sociological Review*.

Asian Studies

Asian Studies is published by the Institute of Asian Studies, University of the Philippines Diliman. It started publication in 1963. The latest issue that is available in libraries is 2001. It started as a thrice-a-year publication. However, it became an annual publication in 1977. It contains articles on East Asia, Southeast Asia, and the Philippines. It covers social and cultural issues about the Philippines and Asia in general.

Education Quarterly

Education Quarterly began its publication in 1953. It is published by the College of Education, University of the Philippines Diliman. It caters to students, alumni, teachers, and administrators of Philippine schools. It also contains information which may be of interest to the general reader. In 1959, it merged with the *U.P. Education Library News* and the *U.P. Education Alumni Reporter*. The merging enabled the journal to be a medium of communication between its patrons and the College of Education. The latest issue that was available in the U.P. College of Education was published in 2005. It was published quarterly until 1992 when it became an annual publication.

Journal of History

Journal of History is the official publication of the Philippine National Historical Society. It features selected papers from annual national conferences of the Society. These conferences have been held all over the country to present to its participants the most recent local and national researches in history and other related disciplines. The Journal began as *Historical Review* and then it became the *Journal of the Philippine Historical Society*. It officially became *Journal of History* in 1965. The issues of the *Journal of History*, in whatever title it was identified, were included in this study. Hence, the journals that were included started in the year 1953.

Journal of Philippine Librarianship

The Journal of Philippine Librarianship is an annual publication of the U.P. School of Library and Information Studies. It started its publication in 1968 as a semi-annual publication but in the last few years, it shifted into an annual publication. It covers all fields of librarianship and information science, and it also includes librarianship in relation to law, medicine and health, archives, user services, ethics, information technology, and technical aspects of librarianship.

Philippine Journal of Psychology

Philippine Journal of Psychology was first issued in 1968 as a semi-annual publication until 1980 when it changed into an annual publication. It is the official publication of Psychological Association of the Philippines. It publishes empirical, theoretical, or conceptual articles which contribute to understanding of Filipino behavior.

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Philippine Journal of Public Administration

Philippine Journal of Public Administration began in 1958 as a quarterly publication of the U.P. National Center for Public Administration and Governance. It contains all aspects of public administration and its main contributors are Filipino authors.

Philippine Law Journal

This journal has the longest period coverage in this study. It began in 1914 and its frequency has changed from time to time. From monthly issues, it became semi-monthly. Recent volumes are issued quarterly. It is a student-run publication of the U.P. College of Law. It contains articles on the promotion of legal research and dissemination of legal knowledge.

Philippine Political Science Journal

This journal is published by the Philippine Political Science Association. It contains articles on the origins and developments of political science in the Philippines as well as issues concerning political science in the different regions of the country. Although the inclusive years are 1974-2001, volumes 17-30 (i.e., 1983 to 1989) are not available. Journal collections of several libraries were checked to complete the gap but to no avail. The volumes that are missing were not available in the libraries or collections that were supposed to have all the issues. Only those volumes that were present in the libraries that were consulted were included in the study.

Philippine Review of Economics

Philippine Review of Economics, published by the U.P. School of Economics and Philippine Economic Society, began as *Philippine Review of Business and Economics* in 1964. It used to be a semi-annual publication until 1978 when it shifted into a quarterly publication. In March 1979, its title was changed to *Philippine Review of Economics and Business* and in 2000, it was renamed *Philippine Review of Economics*. It became a semi-annual publication in 1989.

Philippine Sociological Review

Philippine Sociological Review is a quarterly publication of the Philippine Sociological Society. In October 1972, it included anthropological issues in the Philippine setting.

Only authors of articles and research notes were included. Authors of editorials or reviews were excluded.

The gender of the author was categorized as male, female, or unknown, based on the author's first name. If the author's first name consists only of initials, it was categorized as "unknown".

The number of articles contributed by a particular author was counted and that is the number of times an author's name has appeared in publications. Frequency counts were done to find out the number of articles contributed by the authors in the discipline and the gender patterns of authorship.

The contributions and the observed number of authors were used to find out the predicted number of authors which is equivalent to Lotka's Law ($1/n^2$). The total number of authors who contributed one article each was multiplied by $1/\text{contributions}^2$. The proportion of observed authors (POA) was computed by dividing the number of observed authors by the sum of all the observed authors. The cumulative frequency of observed authors (CFOA) was arrived at by adding each portion of observed authors cumulatively. A similar process was done to the proportion of expected authors (PEA) or Lotka's predicted number of authors, and the cumulative frequency of expected authors (CFEA). To find out the significance of the largest difference between the CFOA and CFEA, it was compared to the p-value which was computed by using the Kolmogorov-Smirnov (K-S) formula for finding the K-S coefficient at $\alpha = .01 = 1.63$ which is $1.63 / \sqrt{\text{total of observed authors}}$. If the largest difference is greater than p or the value of K-S, then the null hypothesis is rejected. Otherwise it was accepted.

Lotka's Law was applied to define the frequency of publication by authors in each field. A more specific analysis was done by taking into consideration the time frame where all the journals in the study have publications.

Results

Number of Contributions and Gender of Authors

This part identified the number of contributions of each author and the gender of the contributors. Data was gathered by tabulating the names of the authors, identifying their gender, and by counting the number of times when their names appeared as authors in the articles.

Authorship Structure of Scholarly Disciplines

Whole Series

This time frame refers to the entire time of existence of each journal. The time includes the beginning of the publication of the title until the latest issue which was included in this study. The different journal titles have different dates of publication of their first volumes or issues and different dates of latest issues that are available.

Asian Studies (K-S=0.11812)

Four hundred thirteen authors contributed in the *Asian Studies* with a total of 549 articles. Three hundred thirty five articles were contributed by 335 different authors. This bulk constitutes 81% of the total of observed authors. Of this number, majority of the contributors were males, counted at 191. One male author was productive at contributing 10 articles. He constitutes .24% of the observed authors.

Education Quarterly (K-S=0.07268)

Three hundred twenty nine female authors contributed to *Education Quarterly*. Thirteen more authors were of indeterminable gender. The other 261 were male authors. Three hundred fifty eight articles were contributed by 358 distinct authors. One male author was prolific in contributing 23 articles, which may be of single authorship or in collaboration with others. He constitutes .2% of the total number of contributing authors.

History Journal (K-S=0.12217)

One hundred seventy eight authors were observed in the *History Journal*. The males make up majority of the authors at 128. There were 41 females. Nine authors were of indeterminable gender. Sensitivity test was done to disregard the value of the gender categorized as "N" by adding its value to each identified gender. The result still yielded values in favor of the male gender. This shows that the *History Journal* is dominated by male authors.

Journal of Philippine Librarianship (K-S=0.16812)

The *Journal of Philippine Librarianship* (JPL), inasmuch as the librarianship profession has been significantly dominated by women, is also a female-dominated publication. Sixty two females were observed as compared to only 32 males. Of the 62 females, 53 contributed one article each, while 25 males wrote one article each. The 78 authors who contributed

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only one article each constitute 83% of the total number of authors in the journal.

Philippine Journal of Psychology (K-S=0.09920)

One hundred seventy four females contributed to the *Philippine Journal of Psychology*. The psychology discipline in the Philippines seems to be a female-dominated field. Sixty four percent of the total number of contributing authors is female. The most prolific author, however, was a male who was responsible for 14 articles.

One hundred ninety two distinct authors contributed one article each. This number constitutes 71% of the total of observed authors.

Philippine Journal of Public Administration (K-S=0.06768)

Five hundred eighty authors contributed to the *Philippine Journal of Public Administration (PJPA)*. Majority of the contributors in this journal were males, who constitute 64% of the total number of authors. Even the most prolific author (.2%) in this journal, who contributed a total of 30 articles, is male.

Philippine Law Journal (K-S=0.05314)

The *Philippine Law Journal* is the longest-running journal that was included in this study. Nine hundred forty one authors were observed during the whole time that the journal was published. Of this number, 722 authors contributed one article each. This constitutes 77% of the total number of authors. Five hundred thirty three of these authors were males, 182 were females, and seven were of indeterminable gender. One author contributed a total of 26 articles, while two authors contributed 25 articles each. Majority (707) of the contributors who were observed in this journal are males.

Philippine Political Science Journal (K-S=0.14757)

One hundred twenty two authors were observed in the *Philippine Political Science Journal*. More males than females contributed in this journal. In fact, the most prolific author, who wrote nine articles, is male. He may have worked on an article by himself or may have worked on an article with multiple authorship. On the other hand, 76% was observed to have contributed only one article.

Philippine Review of Economics (K-S=0.09349)

One hundred ninety males were observed in this journal, 127 of whom were observed only once. One author was prolific at having contributed 16 articles. This particular male constitutes .3% of the population. Eighty seven female authors were also observed, while 27 authors were of indeterminable gender.

Philippine Sociological Review (K-S=0.07290)

Five hundred authors contributed to the *Philippine Sociological Review*. Of this total, 386 have written only once. This number constitutes 77% of the total number of authors in this journal. The most prolific author contributed the 15 articles. More male authors were observed than women authors.

1974-1994

This time period was chosen because all the journals that were included in the study were confirmed to be in existence and to have publications during the twenty years that was common to all of the titles.

Asian Studies (K-S=0.14942)

One hundred nineteen authors contributed in *Asian Studies* from 1974 to 1994. Of this number, 72 were males while 28 were females. Two authors (1.7%) contributed four articles each. Ninety eight authors were observed to have contributed only once. They make up 82% of the total number of authors who contributed during this period.

Education Quarterly (K-S=0.10701)

Two hundred thirty two authors contributed to *Education Quarterly* during the period covered in this part of the study. Of the 232 observed authors, 156 authors appeared only once. This number constitutes 67% of the total number of contributions in this journal. Two authors were observed to be prolific at 13 and 10 contributions, respectively. Both authors are women. *Education Quarterly* is a female-dominated journal.

History Journal (K-S=0.20218)

Similar to the result in this journal for the entire time of its publication, it is also a male-dominated journal from 1974 to 1994. Forty

three males were observed out of a total of 65 contributors. Of the 43 male authors, 32 contributed only once. The author who contributed the most, 5 articles, is a male.

Journal of Philippine Librarianship (K-S=0.2123)

Women authors dominate the *Journal of Philippine Librarianship*. From 1974 to 1994, 27 women authors were observed, with the most prolific writer who contributed 10 articles also being a woman. Fourteen male authors were observed for the indicated time period. Thirty four authors were observed just once. They make up 83% of the total number of authors.

Philippine Journal of Psychology (K-S=0.14579)

Another female-dominated journal for 1974 to 1994 is the *Philippine Journal of Psychology*. Ninety (72%) women authors were observed while there were only 30 males who contributed during this period. One hundred two authors comprise 82% of the total number of authors for this period, while the most prolific author (.8%), a male, contributed a total of 6 articles.

Philippine Journal of Public Administration (K-S=0.09759)

Two hundred seventy nine authors contributed in this journal for the period covered. The most prolific author who contributed 15 articles constitutes .7% of all the authors. Two hundred fifteen authors have written just once. Fifty eight percent of the total number of authors who contributed during this period were men, 29% were women, and 12% were of indeterminable gender.

Philippine Law Journal (K-S=0.09199)

Three hundred fourteen authors were observed in *Philippine Law Journal* from 1974 to 1994. The most prolific author contributed 14 articles. She comprises .3% of the total number of authors for the period covered. Two hundred fifty six authors made only one contribution, majority of which are males at 181. The *Philippine Law Journal* is a male-dominated publication.

Philippine Political Science Journal (K-S= 0.17778)

There were 81 observed authors in the *Philippine Political Science Journal*, 61 of whom contributed only one article each. They make up 75% of the total number of authors. Majority of these 61 writers were males at 43 versus 14 females. The most prolific author who contributed eight articles is male.

Philippine Review of Economics (K-S=0.12287)

A total of 176 authors contributed in the *Philippine Review of Economics* from 1974 to 1994. One hundred thirty four of these authors contributed only one article each. This number comprises 76% of the total number of observed authors, 78 of whom were males, 39 were females, and 17 were of indeterminable gender. The most prolific author (.5%) was a male who contributed a total of 16 articles. Generally, the *Philippine Review of Economics* is a male-dominated journal. Even if the 18 authors of indeterminable gender were added to each gender, there would still be more men than women.

Philippine Sociological Review (K-S=0.11275)

Two hundred nine authors were observed in this journal for the period covered. One hundred fourteen of these authors were males, 92 of whom contributed only one article each. The total number of authors who were observed to have written only once comprises 82% of the total number of authors. The most prolific author is a male. The *Philippine Sociological Review* is a male-dominated journal, but the women are not left behind that much in number because 89 of them were also observed.

Lotka's Law

The researcher posed this hypothesis: The selected Philippine research journals conform to Lotka's Law of Scientific Productivity.

This hypothesis was tested on two time series: one for the whole series meaning, from the time that each title was first published up to its latest issue, and another for 1974 to 1994, the common time when all the titles have produced publications. These time frames help us identify whether there are any differences if the journals were compared during the entire time of existence of each journal or during the time when all journals are already in existence.

Every author who contributed an article is counted as one (1). Although the number of authors is distinct, the number of articles is not. An article may be by a single author or by several authors. Hence, the focus of this study is the contributors themselves.

The calculations for applying Lotka's Law to the whole series and on their common time period, which is from 1974 to 1994, are given.

Whole Series

Journals Which Do Not Conform to Lotka's Law

Following are the titles whose differences between the cumulative frequencies of observed authors and the cumulative frequencies of expected authors (CFOA-CFEA) produced values which are larger than the computed p -values for each journal.

An application of the Kolmogorov-Smirnov test on the data from *Asian Studies* yielded a p -value of .08011. Superimposing this value to the largest difference between the CFOA and the CFEA, which is **.20084**, it reveals that authorship in *Asian Studies* does not conform to Lotka's law. The POA for authors who contributed only one article is 80%, which is far greater than Lotka's which predicted more or less 60%. *Education Quarterly* also does not conform to Lotka's Law. Its p -value is .07268 while the largest difference is **.11812**, which is greater than the p -value.

The computed difference between the CFOA and the CFEA for the *Journal of Philippine Librarianship* also yields the largest difference of **.21204** which is much greater than the p -value of .16812. Although Lotka's predicted authors for this journal holds true for one-article contribution at 62%, the difference between the POA for those who contributed only one scholarly work is far greater at 83%. This finding also does not conform to foreign studies' findings that Lotka's Law applies to library and information science journals. It seems that in the Philippines, authors who contribute only one article tend to overdo it by not contributing again.

The *Philippine Journal of Psychology* also does not conform to Lotka's law. There is also seen a 10% difference between the number of authors who contributed only one article each in the POA (71%) and PEA (61%). The p -value was set at .09920 while the largest difference is **.28745**.

There is a big difference between the POA and the PEA of the most prolific author in the *Philippine Journal of Public Administration* (.17% and .08%, respectively), and the POA and PEA of authors who contributed only one article (73% and 58%, respectively). The largest difference is .14986 which makes the researcher reject the hypothesis that *PJPA* conforms to Lotka's Law.

The *Philippine Law Journal* also does not conform to Lotka's Law. The largest difference between the CFOA and CFEA is **.19623** which is greater than the p -value, .05314.

Two hundred twenty nine authors contributed only one article each in the *Philippine Review of Economics*. This number constitutes 75% of the total *Authorship Structure of Scholarly Disciplines*

number of contributors. There is also a big difference between the POA and the PEA (75% and 58% respectively). This is also reflected in the largest difference between the CFOA and CFEA in this journal.

Lotka's Law also does not apply to the *Philippine Sociological Review*. The computed p-value was only .07290 while the largest difference between CFOA and CFEA is **.18384**. There is also a big difference between the POA (77%) and PEA (59%) of the authors who contributed only one article each.

Journals Which Conform to Lotka's Law

The following titles, on the other hand, have differences between the cumulative frequencies of observed authors and the cumulative frequencies of expected authors (CFOA-CFEA) which are larger than the computed -p-values for each journal.

For the whole series of the *History Journal*, the largest difference is **.11432**. Superimposing this to the computed K-S which is .12217 makes the largest difference smaller than the p-value. This means that the *History Journal* conforms to Lotka's Law. A closer look at the results reveals that the most prolific author who contributed 14 articles comprises .56% of the total number of observed authors while those authors who contributed only one article comprise 73% of all the authors combined.

The *Philippine Political Science Journal* also conforms to Lotka's Law, The largest difference, which is **.11875** is smaller than the p-value which is .14757. Although there is a big difference between the POA and the PEA of those who made only a single contribution (76% and 64%, respectively), only a slight difference is seen between the POA (.8%) and PEA (1%) of the most prolific author.

Table 1.
Lotka's Law As Applied to the Journals (Whole Series)

Title	OA	Gender			Lotka's	CFOA-CFEA
		M	F	N		
<i>Asian Studies</i>	414	244	83	86	408.20	0.20084
<i>Education Quarterly</i>	503	261	229	13	508.20	0.11812
<i>Journal of Philippine Librarianship</i>	94	32	62	0	91.18	0.21204
<i>Philippine Journal of Psychology</i>	270	80	174	16	267.00	0.28745
<i>Philippine Journal of Public Administration</i>	580	369	139	72	595.00	0.14986
<i>Philippine Law Journal</i>	941	707	226	8	988.75	0.19623
<i>Philippine Review of Economics</i>	304	190	87	27	312.00	0.16949
<i>Philippine Sociological Review</i>	500	301	176	23	510.00	0.18384
<i>History Journal</i>	178	128	41	9	173.30	0.11432
<i>Philippine Political Science Journal</i>	122	81	35	6	113.70	0.118757

OA=Observed Authors

1974-1994

Journals Which Do Not Conform to Lotka's Law

Asian Studies has .1912 as its largest difference which is greater than the computed p-value of .14942. This result is similar to that during the entire term of its existence. The POA of *Philippine Journal of Psychology* was computed at 82% for those authors who contributed only one article, while Lotka's predicted author is at 62%. The *Philippine Journal of Public Administration* also does not conform to Lotka's Law. The p-value was computed at .09759 while the largest difference between the CFOA and CFEA is **.1846**. *Philippine Review of Economics* also incurred a value of **.14143** in the largest difference. This is greater than the p-value of .1229. Like the preceding journals, the same results can be seen in the *Philippine Sociological Review*. The observed authors who contributed only one article is much greater than Lotka's expected number of authors.

The *Philippine Law Journal* also does not conform to Lotka's Law. The largest difference, **.24334**, is greater than the K-S value which is only .09199.

Authorship Structure of Scholarly Disciplines

Journals Which Conform to Lotka's Law

Education Quarterly, for the period 1974 to 1994, conforms to Lotka's Law. There is not much difference in authors who contributed only one article. The p-value for this period is .10701 which is greater than the largest difference at .05088. This finding is different from applying Lotka's Law to this journal during its entire existence.

History Journal also reveals similar results. For its observed authors, the most prolific author who contributed five articles in a span of twenty years comprises 1.5% of the total number of authors in the inclusive years. Those who were able to write only one article comprise 77% of all the authors who contributed in the journal from 1974 to 1994. When the largest difference between the CFOA and CFEA is compared to the value of K-S which is .20218, it is much smaller than the p-value.

The *Journal of Philippine Librarianship* also conforms to Lotka's Law. Although the computed percentages of OA and EA of those authors who contributed only one article are 83% and 61% respectively, the most prolific author comprises 2% of the total number of authors, which is what Lotka's Law theorizes. *Philippine Political Science Journal* from 1974 to 1994 also conforms to Lotka's Law. Although the computed POA and PEA for authors who only did one contribution are 75% and 64%, respectively, the largest difference, **.10847** is smaller than the computed p-value which is .17778.

Table 2.
Lotka's Law As Applied to the Journals (1974-1994)

Title	OA	Gender			Lotka's	CFOA-CFEA
		M	F	N		
<i>Asian Studies</i>	119	72	28	19	112.90	0.19120
<i>Education Quarterly</i>	232	95	129	8	224.00	0.05088
<i>History Journal</i>	65	43	20	2	59.06	0.10883
<i>Journal of Philippine Librarianship</i>	41	14	27	0	39.90	0.21233
<i>Philippine Journal of Psychology</i>	125	30	90	5	121.00	0.19638
<i>Philippine Journal of Public Administration</i>	279	163	82	34	286.00	0.18460
<i>Philippine Law Journal</i>	314	224	87	3	329.40	0.24334
<i>Philippine Political Science Journal</i>	81	55	22	4	75.40	0.10847
<i>Philippine Review of Economics</i>	176	114	44	18	170.00	0.14143
<i>Philippine Sociological Review</i>	209	114	87	8	209.00	0.21941

OA=Observed Authors

Conclusion

Of the several characteristics of authorship that were enumerated in the introduction, this paper identified the following: number of articles produced by the authors, a ranking of the most prolific author in the field, and an identification of the author's gender.

When it comes to gender, one can conclude that males make far greater contributions of articles than females, except in the disciplines whose professions are also dominated by women. This is probably affected by the status of male and female in Philippine society where men have more time for study and research because they are not expected to do household chores after office hours.

When it concerns productivity, Lotka's Law, which states that 60 percent of contributors will publish only one article, 15 percent will have two publications ($1/2^2$ times .60), seven percent of authors will have three publications ($1/3^2$ times .60), and so on, does not apply to the following journals:

Table 3.
Journals Which Do Not Conform to Lotka's Law

Whole Series	1974-1994
<i>Asian Studies</i>	<i>Asian Studies</i>
<i>Education Quarterly</i>	
<i>Journal of Philippine Librarianship</i>	
<i>Philippine Journal of Psychology</i>	<i>Philippine Journal of Psychology</i>
<i>Philippine Journal of Public Administration</i>	<i>Philippine Journal of Public Administration</i>
<i>Philippine Law Journal</i>	<i>Philippine Law Journal</i>
<i>Philippine Review of Economics</i>	<i>Philippine Review of Economics</i>

This result indicates that Filipino authors exceed the 60% benchmark for authors who contribute only one article and/or the 2% benchmark for authors who contribute more than several articles. A lot of authors are satisfied to have contributed only one article and they do not attempt to follow it up with another one. When it comes to research publications, it seems that the Philippines is not a highly productive country.

This result may have been affected by some factors, which, according to Gerke and Evers (2006) may be:

1. There are gate-keepers that allow or hinder the globalization of knowledge by preventing its publication for reasons of which the quality of research is only one;
2. Knowledge governance, the active support of research and development, is an important factor in the success or failure of local knowledge production; and
3. The epistemic culture of knowledge production, including the use of languages, appears to be a decisive but, in the context of Southeast Asian studies, an under-researched area.

Two journals conformed to Lotka's Law when the span of time was limited to 1974-1994. This means that during the indicated span of time, more authors were able to contribute more than one article in *Education Quarterly* and in the *Journal of Philippine Librarianship*.

The following journals conform to Lotka's Law during the two ranges of time:

Table 4.
Journals Which Conform to Lotka's Law

Whole Series	1974-1994
<i>History Journal</i>	<i>History Journal</i>
<i>Philippine Political Science Journal</i>	<i>Philippine Political Science Journal</i>
	<i>Education Quarterly</i>
	<i>Journal of Philippine Librarianship</i>

Notice that *History Journal* and *Philippine Political Science Journal* consistently conformed to Lotka's Law during the whole range of the publications or during the indicated time span. This may be due to the encouragement of authors who contribute articles in the journals. While one author may be prolific in contributing several publications, the other authors are also prolific in contributing more than one article.

This indicates that in the Philippines, only a few journals conform to Lotka's Law. Authors who contribute more than one article dominate the different disciplines and they are also motivated and encouraged to contribute more. Those authors who contribute only one article would need

more prodding to write another contribution. Of course, there may be factors involved such as time, appropriate funding, and relevant topic to work on. But essentially, people have to be encouraged to do research in their particular fields and to inform other people about their findings by having their articles published in scholarly journals. Editors and publishers of the journals should also exert more effort to encourage writers to contribute articles as well as to scout for possible contributors in the different disciplines.

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