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Science Editing (Sci Ed) is the official journal of the Korean Council of Science Editors (<http://kcse.org>) and Counail of Asian Science Editors (<http://asianeditor.org>). It aims to improve the culture and health of human being by promoting the quality of editing and publishing scientific, technical, and medical journals. Expected readers are editors, publishers, reviewers, and authors of the journals around the world; however, specially focused to those in Asia. Since scholarly journals in Asia are mostly published by the academic societies, universities, or non-profit organizations, Sci Ed is sought to play a role in journal development. The number of publications from Asia is increasing rapidly and overpass that of other continents; meanwhile, the number of international journals and highly appreciated journals is yet to be coming forward. It is task of Asian editors to pledge the journal quality and broaden the visibility and accessibility. Therefore, its scope includes the followings in the field of science, technology, and medicine.

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- Data mining on the editing and publishing
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- Research ethics and medical ethics including clinical registration, statement of human and animal health protection, and conflict of interest
- Publication ethics: fabrication, falsification, plagiarism, duplicate publication, and authorship
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- Legal issue in journal publishing
- Peer review process
- Reporting guideline for medical journals
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- Advanced information technology applicable to journal editing and publishing including PubMed Central schema, journal article tag suite schema, Digital Object Identifier, CrossMark, FundRef, ORCID, datacite, QR code, and App
- International standard of journal editing and publishing including International Committee of Medical Journal Editors' Recommendations
- Reference styles including Vancouver (NLM) style, APA style, IEEE style, and ACS style
- Digital publishing in the web and App
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The reference section of an academic journal paper plays a crucial role in many quantitative analyses of journals including their evaluation. Databases such as Web of Science and Scopus and evaluation metrics such as the impact factor and the h index are all based on the references. Many innovative activities initiated by Crossref are also based on connecting a great number of articles through their DOIs (digital object identifiers) and references. Currently, references of articles provide a unique route for imbedding them in a network of a huge number of academic articles. By analyzing this network, one can obtain the essential information about journals and researchers.

Because the reference section has such a great importance, it is highly desirable for authors to put much effort into selecting appropriate references for their papers. In the old days, when scholars who wrote one or two papers a year got enough recognition, I believe most authors spent a sufficient amount of time writing their papers and selected their references carefully. In these days, however, scholars need to write a lot more papers on the average to get recognized as productive researchers and acquire external research funding, especially in the areas of science and engineering. Consequently, they tend to make less effort in writing individual papers than before. As far as the references are concerned, I think it often happens that many of them are copied from earlier papers on the same topic, or are chosen simply because they were written by famous people or were published in prestigious journals, despite of having little direct relevance to the citing paper. Moreover, it is not unusual to find misbehaviors or unethical behaviors in referencing, such as self-citing the authors' own papers excessively and some number of people or journals teeming up to cite each other [1]. All of these are impairing the real meaning and importance of the reference section.

From this perspective, I would like to make a new proposal. Nowadays, many journals require authors to select a small number of keywords for their paper. What about also asking them to select a small number of key references pertinent to their paper? Every author has a few references which played an especially important role in performing their actual research. They might have hit upon their crucial ideas or have learned essential techniques and methods by reading them. It is important to select those references as key references, not just those written by famous researchers in the field or published in top journals. From this criterion, it is natural to forbid author self-citations. It is also recommended that review papers, which are usually cited more often than regular papers, are not included in the key references.

The maximum number of the key references, N , needs to be small to make their selection to be meaningful. In order to use the database of key references in constructing independent

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journal and author metrics, all journals participating in this proposal have to adopt the same or similar value of N. I feel N=5 can be a suitable choice. As these data are accumulated, I think it will provide useful information on the practical importance of the references to actual research, which is independent from that obtained by considering the whole set of references. It may provide a new measure for evaluating journals and researchers from a different perspective. It also has an advantage that there is no variation among different academic disciplines, if the same N is chosen for all journals.

Journal metrics based on references such as the impact factor have contributed to the development of academic journals greatly. More recently, however, it has been pointed out that these metrics have some deficiencies and need to be used with much caution. New metrics based on the proposal made here can be a useful supplement to the existing metrics. I have to

acknowledge, however, that it is always possible to manipulate any metric, such as by two people citing each other's paper. Nevertheless, with the rapid development of information technology, it will be possible to detect many anomalous behavior patterns and exclude the corresponding articles from the database to make the metrics more reliable.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Reference

1. Van Noorden R. Brazilian citation scheme outed. *Nature* 2013;500:510-1. <http://dx.doi.org/10.1038/500510a>

Editing and publishing activities of the Korean Physical Society during the first fifty years since its inauguration in 1952

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Abstract

This is a historical review concerning the development of the editing and publishing activities of the Korean Physical Society, unique in its kind in South Korea, during its first fifty years since inauguration. It was founded in 1952, in the midst of the Korean War, and issued its first publication only in 1961. Despite such a late start, the society made great efforts to boost its activities thereafter, developing five different periodicals, including two Science Citation Index-listed journals, established by 2002. It can be seen as a remarkable success story of the Korean physics community, having overcome many hardships, which included the meager human and material resources that it started with and also the social unrest and destruction owing to the Korean War and its aftermath. The development and progress of the Korean Physical Society during this period, with a main focus on its editing and publishing practices, are briefly described.

Keywords

History; Publications; Societies

Introduction

At the time when Korea was liberated from Japanese rule in 1945, the Korean physics community, if it existed at all, was in an isolated or very primitive state. There was only a small group of Korean physicists with Bachelor's degrees and very few with Doctorate degrees, who had been mostly teaching at middle and high schools or private junior colleges. Division of the country in two—namely, North and South Korea—by the allied forces at the end of World War II, brought severe political, social, and ideological chaos. This resulted in a further reduction, almost by half, of South Korean physicists' manpower, due to those who joined the North. The only research institution with a physics program that had existed in Korea before its liberation, Keijo Imperial University, had been entirely staffed by Japanese scholars, who were repatriated to Japan as soon as the War ended, leaving it completely vacant. Thus, when the US

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Military Government reopened the institution, renaming it Seoul University, it could hardly find enough qualified Korean physicists who might be able to fill those vacancies.

Due to such problems, it was not until 1952 that the Korean Physical Society (KPS) could be inaugurated, in the midst of the Korean War, which broke out in June 1950. But, because of the lack of necessary resources, it could hardly perform any meaningful activities for some time. After the Korean War culminated in the ceasefire of 1953, the activities of the Korean physics community gradually gathered momentum and KPS could issue its first official publication in a half-bulletin, half-lecture notes format in 1961. However, as many foreign-trained Korean physicists returned to work in the newly opened institutions supported by the Military Government, the publications of KPS steadily improved both in quality and quantity. By 2002, its 50th anniversary of formation, KPS had in publication five different world-class periodicals, including two Science Citation Index (SCI)-listed journals.

We will begin with a brief overview of the development of KPS, and then look at its progress in editing and publishing practices in more detail. Most of the historical events and works of KPS mentioned here were based on the book *50-Year history of the Korean Physical Society*, published on December 31, 2002 by KPS.

Brief History of the KPS, Focused on Publishing

The inauguration of KPS took place in December 1952 in Busan city, then the temporary capital of South Korea, with

Seoul, its capital, being occupied by the North Korean Army. A total of 34 physicists, mostly of refugee status, gathered and formed the Society under the leadership of Dr. Kyu Nam Choi (Fig. 1), formerly professor of Physics of Seoul National University and then serving as the Seoul National University president. Dr. Choi emphasized to his audiences the obligation of Korean physicists to contribute to the rehabilitation and reconstruction of the war-torn nation through academic advancement and mutual collaboration. The assembly elected Dr. Choi as the first KPS President, together with Dr. Chul Jae Park, professor of Physics at Seoul National University, as the KPS vice president. A nine-member executive committee in charge of general, financial, and editorial affairs as a group was also formed. The meeting agreed to hold a KPS general assembly annually, as well as symposia on current topics, and to make effort towards issuing its own publication—namely, a journal—as soon as possible.

The 2nd KPS general assembly was held in the following year, 1953, again in Busan, and a symposium on X-ray diffraction was led by KPS vice president Dr. Chul Jae Park (Fig. 2), who had worked at Kyoto University on the subject before his return to Korea. When the armistice was signed between the UN Forces and North Korea in late 1953, the KPS office moved to Seoul as originally contemplated, together with most of its members, who found upon their return that their houses, schools and laboratories had suffered enormous war damages. With peace restored, many physicists could take the opportunity to study abroad and, for a time, KPS executive positions had to be left vacant. This further decreased KPS



Fig. 1. Portrait of the late Dr. Kyu Nam Choi (1898-1992) the first president of the Korean Physical Society.



Fig. 2. Portrait of the late Dr. Chul Jae Park (1905-1970) the first vice president of Korean Physical Society.

activity. Meanwhile, KPS joined UNESCO, counting 35 members in April 1954.

The consequent KPS meetings, from the 3rd to the 6th meeting held in Seoul in the 1960s, were able to attract more members to lectures given on various current topics. At the 6th meeting, KPS changed its leadership by electing Prof. Yong Dae Kwun of Seoul National University (Fig. 3) as its second KPS president and by introducing an administrative structure with four executive secretaries in charge of general, financial, external, and editorial affairs, respectively. The new team made an all-out effort to have its first official publication



Fig. 3. Portrait of the late Dr. Young Dae Kwun (1908-1985) the second president of Korean Physical Society, who served for ten years (1960-1970) as the president.

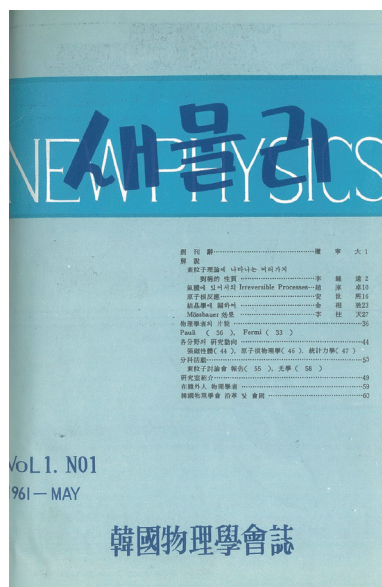


Fig. 4. Cover page of *Sae-Mulli* vol. 1, no. 1 (1961).

see light, and finally, in 1961, KPS succeeded in issuing *Sae-Mulli* (New Physics), containing five review papers and KPS bulletin boards. In the forward address given in *Sae-Mulli* vol. 1, no. 1 (1961) (Fig. 4), KPS president Kwun expressed his utmost gratitude to see the first KPS publication made possible, overcoming tremendous shortcomings in finances and human resources that the Society had faced. He also expressed his deep regret, however, for not yet having been able to make *Sae-Mulli* a real physics journal in its first issue, ending up with a half-bulletin, half-review volume, and he strongly urged and encouraged fellow KPS members to contribute research papers so that the following volumes could constitute a real, professional journal.

His call was answered in *Sae-Mulli* vol. 2, no. 1 (1962), which published seven contributed research papers together with eight review articles. However, the financial challenge that faced KPS in those days was so serious that the editorial secretary was obliged to express his deep gratitude to many members who contributed to support the work. Apparently, KPS could not operate solely with its tiny membership fees. Thus, its elected officers were required to make an all-out effort to meet its financial needs by raising contributions from friends in industry or in commercial sectors. In fact, KPS could not even find accommodation in a fixed office for a long time, such that the KPS address was shifted among the institutions to which the various general secretaries belonged. The editorial secretary, who had to work very hard to obtain enough contributing or review articles for print, could not afford to employ anyone for help with matters such as editing, communicating, and often commuting to the printing com-

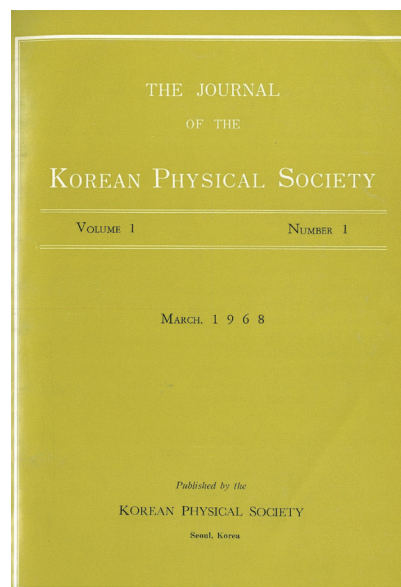


Fig. 5. Cover page of the *Journal of the Korean Physical Society* vol. 1, no. 1.

panies, and was required to oblige his graduate students. In those days, the infrastructure of communication and public transportation was not very well developed in Seoul.

KPS was able to overcome those challenges to continue its upward progress, as the number of returning foreign-trained physicists increased. From 1964, KPS started holding its general assembly twice annually—namely, a Spring Assembly in Seoul (attended by 154 in 1964), and a Fall Assembly in Kwangju, a local city chosen for that year (attended by 92 members). Accordingly, the number of articles published in *Sae-Mulli* also increased, so that its semi-annual publication schedule during 1962-1966 had to be changed to triannual issues in 1967. To meet this greater demand, KPS, from the year 1968, decided to publish another journal in addition to *Sae-Mulli*, the *Journal of the Korean Physical Society* (JKPS, Fig. 5). The articles of this journal were to contain original research and to be written in an international language—English, French, German, or Spanish—while *Sae-Mulli*, mainly in the Korean language, would contain review and original articles alike. In 1968, KPS published two JKPS issues with a total of 14 original research articles and four Short Notes, together with two volumes of *Sae-Mulli* containing eight original and 11 review articles in total.

The publication of JKPS in international languages—mostly in English, in the event—greatly enhanced the status of KPS by attracting authorship and readership beyond national borders. Its editorial board was enlarged to include some prominent foreign scholars and it added a board member specialized in English-language editing. Thus, KPS was able to be-

come a member of the International Union of Pure and Applied Physics in 1970. In the same year, KPS labored to organize a North American branch, with 800 members comprising Korean physicists staying in the US and Canada, including 250 university faculty members, and tried to maintain close relationships with them as well as gain their cooperation. KPS also made a series of efforts to obtain international recognition, for example by hosting the International Conference on Group Theoretical Methods in Physics in 1985, attended by 273 participants from 27 countries, and the 4th Association of Asia-Pacific Physics Societies Conference in 1990, both held in Seoul under the auspices of KPS.

In 1992 the journal of KPS, JKPS, was officially recognized by the Institute for Science Information (ISI) (Fig. 6). And, beginning with JKPS vol. 25, no. 1 (1992), JKPS was indexed in Current Contents/Physical, Chemical & Earth Sciences, Science Citation Index, and SCI Search and Research. In 1995, KPS, to make itself more internationally friendly, lifted the restriction on authorship to KPS members and opened its publication to physicists worldwide. Furthermore, JKPS was allowed to include the proceedings of the international symposia held in Korea, partially in order to have enough material to make it a monthly publication.

The promotion and expansion of the human and financial resources of KPS during its early years is also notable. The membership count in 1962, at the 10th anniversary of its inauguration, was only 240; but in its 20th year (1972), this increased to 1193; in its 30th year (1982), to 1857; in its 40th year (1992), to 4051; and in its 50th year (2002), it recorded 8902 members, a 261-fold increase in membership over 50 years, as shown in Fig. 7. KPS recruited many secondary school physics teachers for its membership and had them participate in the symposia and publish papers in *Sae-Mulli* (later, in *Mulli Kyoyuk*, the 3rd journal of KPS, which was initiated in 1982).

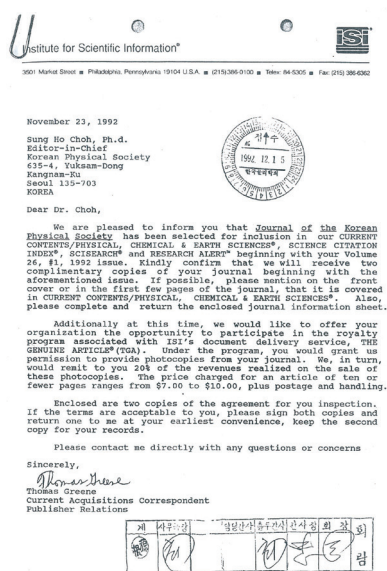


Fig. 6. Institute for Science Information letter for *Journal of the Korean Physical Society*, dated November 23, 1992.

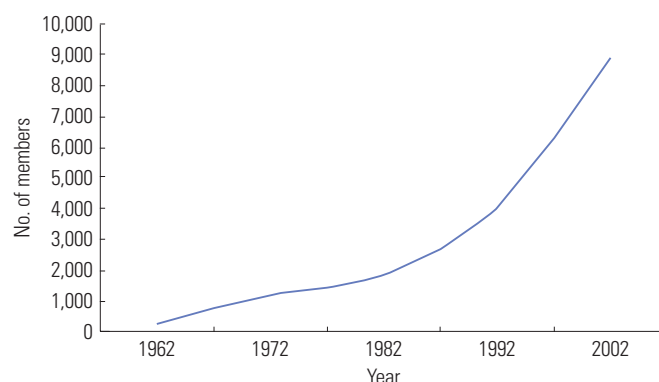


Fig. 7. Chronological change in the number of Korean Physical Society members.

The financial scale of KPS was also gradually increased. The annual budget in 1962 amounted to 146,000 Korean won (KRW), whereas it reached 500 million KRW in 2002, a 3,400-fold increase in 40 years (Fig. 8). The raising of its membership fees (200 KRW in 1962 to 40,000 KRW in 2002, a 200-fold raise) and publication charges partially eased its financial challenges, but fundraising campaigns had to be continued. It also cultivated its own income sources from time to time, derived mainly from its members' donated works. For example, it acquired and maintained the copyright of the general physics laboratory course textbook, authored by volunteering members and adopted by most of the universities and colleges in Korea, and also of the PSSC translation, used widely among high schools for a time. The work of the KPS Physics Terminology Committee, organized in 1955 and subsidized annually until 1975 by the Ministry of Education,

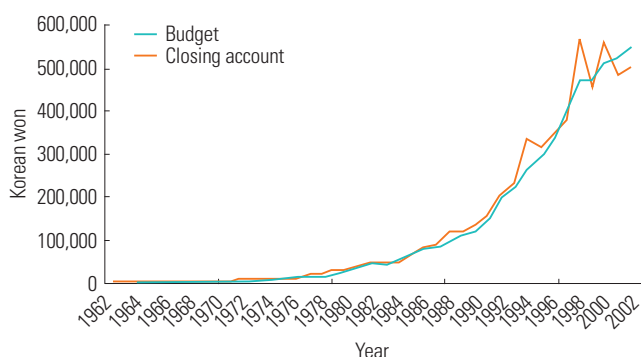


Fig. 8. Chronological change in Korean Physical Society budget and closing account.

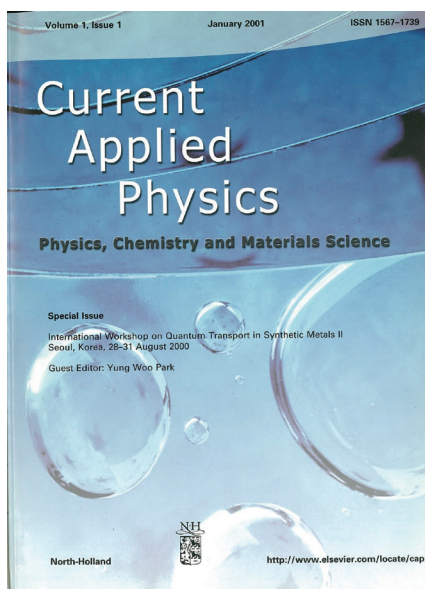


Fig. 9. Cover page of *Current Applied Physics*, vol. 1, no. 1 (2001).

which published textbooks for elementary and middle schools, also helped KPS financially. With its improved financial situation, KPS, in 1976, was able to purchase an office space (132 m²) in the Science & Technology Building at 635 Yeoksam-dong, Gangnam-gu, Seoul, and had its permanent address stationed there.

In 1988, KPS started publishing an additional, 4th journal, named *Current Applied Physics* (CAP) (Fig. 9) to meet the increasing demand from applied-physicist members and also to alleviate the concerns of some separationist movements seeking to organize an independent Applied Physics Society, as in Japan. The journal initially started with three volumes annually, in the Korean language, but from 1989 it became a quarterly publication. KPS made a concerted effort, to be explained in more detail later, to promote CAP to the international level; this was finally rewarded in 2002, following JKPS, by its indexing in SCI-Extended, Web of Science, Materials Science Citation Index, Current Contents/Physical, Chemical & Earth Sciences, and Research Alert (Fig. 10). Thus, KPS, within 50 years of its inauguration, became the publisher of two SCI-listed journals, CAP and JKPS, the latter with a fairly high impact factor (0.526 in 2000).

In 1992, with its 40th anniversary, KPS began to issue its 5th publication, a magazine named *Physics & High Technology*, as a kind of academic science magazine with an aim similar to that of *Physics Today* of the American Physical Society (Fig. 11). With its first volume, then KPS president Dr. Juchon Lee pointed out that its aim was to help enhance research communication between physics and related fields, including

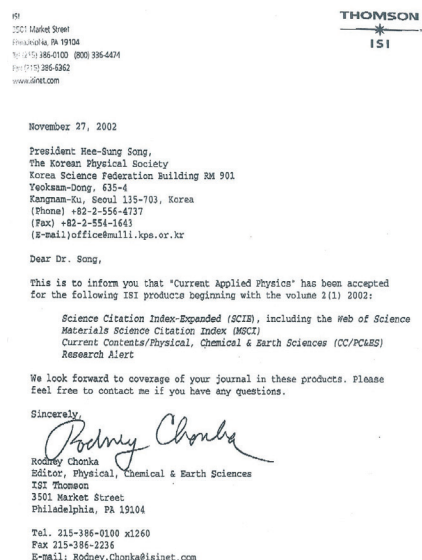


Fig. 10. Institute for Science Information letter for *Current Applied Physics*, dated November 27, 2002.

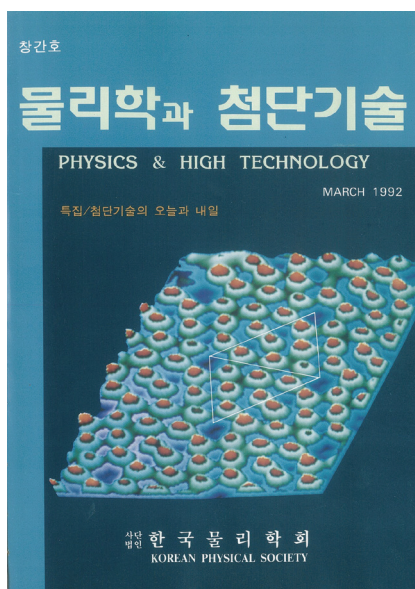


Fig. 11. Cover page of magazine, *Physics & High Technology*, March 1992.

material and electronic sciences, and to stimulate collaboration between academic and industrial sectors by informing readers promptly and accurately of the trends and developments in current research work in such related fields. He also expressed his hope that, through this magazine, new concepts in physics could be better appreciated and assimilated by industrial sectors.

In summary, KPS started from a very humble state of affairs, but it was able to build a solid foundation during its first 50 years, from 1952 to 2002. It became a world-class academic society with nearly ten thousand members, issuing five internationally recognized regular publications. This could only be realized by its dedicated group of hardworking physicists, whose sacrifice was truly laudable. Fig. 12 shows the number of articles published in *Sae-Mulli*, *JKPS*, *Mulli Kyoyuk*, and *CAP*, respectively, during this period.

Editing and Publishing of the KPS

Sae-Mulli publication in the early days (1962-1967)

As stated earlier, the first publication of KPS, *Sae-Mulli*, came out in 1961, nine years after the society's inauguration. Its first volume contained five review articles and physics community news. The editorial secretary (editor), Dr. Chul-soo Kim, who must have faced some challenges in producing this humble product, expressed vividly in the Editor's Note how hard he had worked trying to obtain the manuscripts, contacting many friends and colleagues overseas. He then expressed his whole-hearted thanks to the authors of the five review articles.

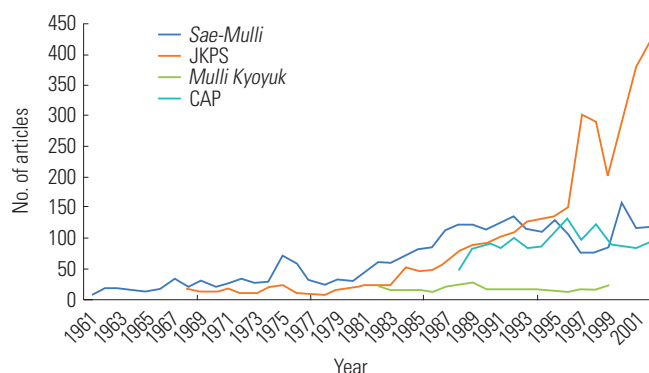


Fig. 12. Chronological change in the number of articles published by Korean Physical Society journals. Now, we will look into the editing and publishing practices of Korean Physical Society in more detail. JKPS, *Journal of the Korean Physical Society*; CAP, *Current Applied Physics*.

The editor alone held all responsibility for the publication, since the editorial board was not officially formed until February 1965. His effort was well rewarded, as in the second volume, *Sae-Mulli* vol. 2, no. 1 (1962), it became possible to have seven contributed papers with eight review articles. In this volume, KPS set temporary guidelines in regard to the contents of *Sae-Mulli*, as follows: 1) Contributed research papers with 30 pages of manuscript paper and with 3 pages of abstract. 2) Review articles with less than 30 pages of manuscript paper. 3) Introductions to current trends and information about the international physics research community. 4) Domestic physics community news, including departmental and institutional activities, personnel appointments, new publications, and new facilities acquired.

This volume had a printed list of the current KPS members, showing a total of 180 members, including 40 absentees who were abroad for study. Then the following volume, vol. 2, no. 2 (1962) listed 32 newly elected KPS fellows who were given more responsibility for the society.

The format of the manuscript was not formalized for several years, and the "Instructions to the authors of *Sae-Mulli*" appeared for the first time only in vol. 3, no. 2 (1963). The instructions read:

- 1) Manuscripts can be accepted only from members or honorary members of KPS. However, non-members may be included as co-authors.
- 2) The manuscript should be submitted to the editor of KPS, and its acceptance for publication is to be judged by the review committee appointed by the KPS president upon recommendation of the executive committee.
- 3) The review committee can request revisions or corrections to accepted papers.
- 4) The length of the manuscript should be less than or equal

to 50 pages of Wongoji (traditional manuscript paper drawn with 200 squares).

- 5) The manuscript should be written in Korean, possibly mixed with Chinese characters.
- 6) A typewritten abstract in English, with 100-200 words, should be attached.
- 7) Figures in the manuscript should be neatly drawn with ink-brush on tracing paper 25 cm × 18 cm in size and attached in a separate file. It is advised to draw the lines of the figure in bold face, for possible contraction in printing.
- 8) The numbering and caption of figures should be clearly indicated and quoted in the main text.
- 9) References should be added at the end of the manuscript in the following order: author's name, journal title, volume, page, and year, such as M.J. Stephen, Phys. Rev., 123, 126 (1961).
- 10) Units and proper names should be written in their original languages.
- 11) Actual cost for the photograph will be charged to the author.
- 12) Authors of accepted and printed contributing papers must pay the publication charge as set by KPS, and will receive 20 free reprint copies.
- 13) Selection of review articles, their subjects, and authors should be made by the editor upon consultation with the KPS executive committee.
- 14) Review articles should follow the same format as contributing papers, but without abstracts.

Among the above instructions it should be noted that manuscript papers were used as a measure for the length of manuscripts. They had been traditionally used for oriental languages by filling each of 200 squares (drawn on each page) with independent characters, but they were quite inappropriate for other languages, and more so for mathematical equations. It seemed that this was unavoidable in those days due to arrangements with the printing facilities available. Similar instructions can be found in other scientific societies, including the Korean Chemical Society (c.f. *Science Editing* 2015;2(1);3-9). It should be recalled that the typewriter for the Korean alphabet, Hangul, had not been invented yet.

The publication charge policy for contributing papers, formally adopted from *Sae-Mulli* vol. 4, no. 2 (1964), was 50 KRW/page for that volume and 100 KRW/page (a 100% increase) for vol. 5, no. 1 (1965). It seems apparent that KPS gradually raised publication charges as more contributing papers were received.

From vol. 5, no. 1 (1965), KPS started accepting papers for *Sae-Mulli* in the English language as well, changing its language policy, under the condition that the extra cost for Eng-

lish editing be charged to the author. Also announced was a raise of the publication charges to 150 KRW/page for English, 50% more than for Korean. Then, from the following vol. 5, no. 2 (1965), the publication charges were doubled, to 200 KRW/page for Korean and 300 KRW/page for English.

In 1965, KPS introduced the KPS editorial committee (board), in addition to the existing executive committee. The committee of six members plus one editor (an editorial secretary who served in the executive committee as well) was formed and elected by the KPS Fellow Meeting and placed in charge of editorial business, including the selection of review committee members for each contributed paper. Each member was to serve a three-year term, with two members elected or reelected every year to maintain its continuity. This somewhat reduced the heavy burden on the editorial secretary, and also set priorities for the editorial work of the Society.

Sae-Mulli, JKPS, and *Mulli Kyoyuk* (1967-1987)

As explained earlier, in 1967 KPS decided to publish a new journal, JKPS, in addition to the existing *Sae-Mulli*, and it changed and expanded its editorial policy. The important changes were as follows:

For *Sae-Mulli*

- 1) Language to be used: Korean, possibly mixed with Chinese characters, but English also permissible with an additional editing charge to the author.
- 2) Contents: Review articles, abstracts of the articles or Short Notes printed in JKPS, the abstracts of lectures or papers presented at the KPS general assembly meetings or symposia, contributed papers in the field of physics education, reports on KPS activities, physics community news, and paid advertisements.
- 3) 50 KRW/page to be awarded to the authors of printed review articles.
- 4) Two copies of the manuscript should be submitted for contributing articles, with the abstracts in English attached.

For JKPS

- 1) Language: An international language—namely, English, French, German, or Spanish—but the title in English.
- 2) Contents: Research papers with originality or Short Notes, reporting unfinished research work.
- 3) Publication charge: 400 KRW/page or 3.00 US dollars/page up to 10 pages, but 800 KRW/page or 6.00 US dollars/page for exceeding 10 pages; authors to receive 20 free copies of reprint.
- 4) Three copies of the manuscript should be submitted for contributing articles and Short Notes, together with the abstracts in English of 50 to 150 words.

We note the change in measure for the length of the manuscript from the Wongoji (traditional manuscript paper) page to printed or typewritten pages, indicating that the Korean Hangul typewriter was in prevailing use. Following this new policy, the KPS issued two volumes each of *Sae-Mulli* and JKPS for the year 1967. Then the Editorial Committee (Board) was enlarged to have two editorial secretaries or editors, one assigned to *Sae-Mulli* and the other to JKPS, and also to have two more board members added. The chairman of the editorial committee (later called the Editor-in-Chief), elected from among the committee members, was elevated to become one of the two vice presidents of KPS.

With the activities of KPS expanding, KPS issued special volumes of *Sae-Mulli*—namely the supplement to *Sae-Mulli*—from time to time, including memorials to the leading Korean physicists who had contributed much to KPS or to the world physics community. The first issue, *Sae-Mulli* vol. 7, no. 2 (1967), was dedicated to Dr. Yong-son Jin, the elementary particle theorist of Brown University. The other issues included *Sae-Mulli* vol. 15, no. 3 (1975), which reported on the symposium on solid state physics, held in the previous year, and *Sae-Mulli* vol. 16, no. 3 (1976), which contained the report on the symposium for physics education, held in 1975. The Editorial Committee continued to publish special issues—namely, *Sae-Mulli* vol. 16, no. 4 (1977) on “Physics and the related sciences” and vol. 21, no. 4 (1981) reporting on the workshops in Elementary Particle Physics held in that year.

KPS had placed the physics education field in high priority from the beginning. The society thus invited high school teachers for authorship as well as for membership, and allocated enough space in the regular issues of *Sae-Mulli* to this field. It even tried to introduce a separate journal for the field in 1982. KPS thus decided to have an additional journal published, named *Mulli Kyoyuk* (Physics Teaching) (Fig. 13). Since then, the Society continued its publication of one or two volumes per year until 1999, when it was integrated into *Sae-Mulli*, which was to include contributing articles in physics education.

Since KPS started publishing JKPS in addition to *Sae-Mulli* in 1968, the editorial board faced less difficulty in obtaining materials to print, and the number of published articles gradually increased, as shown in Fig. 8. JKPS maintained its biannual publication policy until 1982, and from 1983 to 1990, changed to a quarterly publication, and then from 1991 to a regular bimonthly publication. This owed much to increasing research activities within Korea, thanks to expanded research grants from government sources, and also to the increase in international research collaboration. In the meantime, KPS (in 1974) could afford to hire staff for editing, as a part-time position for a year, and then as full-time later. This greatly helped

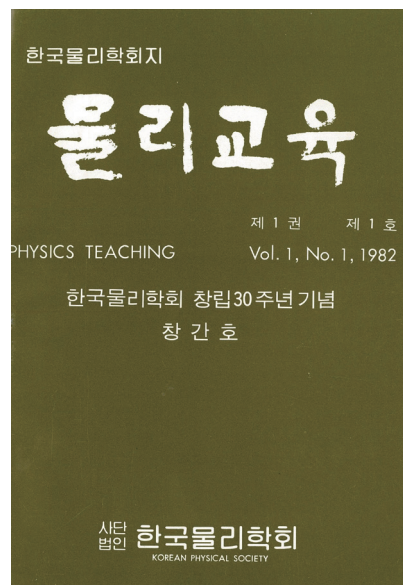


Fig. 13. Cover page of *Mulli Kyoyuk* (Physics Teaching), vol. 1 no. 1 (1982).

in reducing the burden on the editors as well as on their graduate students, and this also contributed to the greater professional appearance of KPS publications.

Sae-Mulli also maintained its quarterly publication for regular issues, besides the above-mentioned irregular supplement issues. The Editorial Board must have worked very hard to obtain enough review articles and additional research papers, mostly in physics education. In 1986, *Sae-Mulli* was finally made a bimonthly publication.

Current Applied Physics and the magazine *Physics & High Technology* added to *Sae-Mulli*, *Mulli Kyoyuk* and JKPS (1988-2002)

KPS added, in 1988, another new publication, CAP, to meet the increase in contributing papers and also to accommodate the expanding scope of so-called applied physics. Initially named “*Ungyong Mulli*”, meaning applied physics, it was changed to “*Applied Physics Review*” in 1997, and to CAP in 1999. Accordingly, it changed the structure of its editorial board, adding one more editorial secretary (the CAP editor), making three in total, and also adding three more board members, for a total of eleven members. CAP started in the Korean language, like *Sae-Mulli* and *Mulli Kyoyuk*. Although KPS aimed to make it a quarterly publication, only three volumes could be issued in the first year. But from the following year on, it fulfilled its expectations.

In 1988, KPS also started seeking more international recognition for JKPS, especially from the ISI. The editorial board made an all-out effort to upgrade JKPS in quality and quantity

by inviting prominent foreign physicists to be JKPS authors, by printing the proceedings of international symposia, held in Seoul and with the participation of world-renowned scholars, by including three overseas members on the editorial board, and by issuing its bimonthly publication punctually. After several trials, KPS succeeded, and from JKPS vol. 25, no. 1 (1992), JKPS was included in the SCI, as stated earlier.

The KPS editorial board, elevated by the ISI recognition of JKPS, then started improving CAP to also meet ISI standards. In 1997, KPS formed a special task force for CAP, which recommended first to change its language, from Korean to English. In 1999, the CAP editorial board was expanded, inviting two Nobel laureates (A. J. Heeger of USA and H. Shirakawa of Japan) to join the 20-member CAP international advisory board and also to have them participate in refereeing submitted papers. Thus, the first English version of CAP, vol. 1, no. 1, (2001) appeared as an international journal, including the papers by two Nobel laureates (J. R. Schrieffer and H. Shirakawa) among others. KPS took another bold step for CAP by placing the Elsevier Science Publishing Company of the Netherlands in charge of its printing from the year 2001. All these efforts were rewarded in 2002 by the recognition of ISI for CAP, following JKPS, as reported earlier (Fig. 10).

When KPS started publishing a magazine, *Physics & High Technology*, beginning in 1992, it became necessary to form a separate editorial board for the magazine, to accommodate wider ranges of topics to be cultivated, quite different from the other journals. Thus the Magazine Editorial Board, consisting of 13 members with an editor, was formed independently from the existing Journal Editorial Board. The members were chosen from experts in broad fields of the sciences, including people from life and material sciences. The board selected special topics for each issue of the magazine. For example, the first issue examined high technology of today and the future, the second issue focused on science education, and the third volume on science policy, so that the magazine could serve as a kind of bridge between physics and related communities. Other topics in the magazine included new materials, energy, environment, nano-sciences and its technology, magnetism and magnetic materials, physics and sports, etc. They were presented together with reports on various international symposia and events. The committee members were regularly replaced to have newer and fresher topics discussed. As the magazine became popular, it also attracted more advertisements, and this helped KPS financially as well.

Since 1992, the KPS started developing an office automation system and journal management program, and in the following year of 1993, KPS formed a task force committee for this purpose and embarked on developing the KPS-TEX program for the publication of journals. As a result, KPS was

able to successfully publish *Sae-Mulli*, JKPS, and CAP by utilizing a newly developed KPS-TEX program from 1995 onwards. A dedicated line (TI) was secured for online journal submission through e-mail and other means. An open-journal system for KPS was achieved in 1999 through the uploading of PDF files of JKPS articles to the Society homepage, and it has continued its effort in e-publishing and open-journal systems.

The KPS Journal Editorial Committee was reorganized in 1997 to have 17 members with five editors (one for each periodical), and it made a concerted effort to upgrade the publication under the editor-in-chief or editorial vice president. It contemplated making JKPS a monthly journal, *Sae-Mulli* and CAP bimonthly ones, and *Mulli Kyoyuk* a semi-annual publication journal, and was soon able to fulfill these goals. The committee also reshaped all editorial regulations, including the instructions to authors and the review procedures for each journal, some of which are shown in the appendices. The KPS editorial board updated the editorial regulations for each periodical in 1997. *Journal of the Korean Physical Society*-related regulations are listed in Appendices 1 and 2.

Miscellaneous publications of KPS

Besides the above-mentioned journals and magazine published in a regular manner, KPS issued many irregular publications. Some of them were titled as supplements to the existing journals, such as the supplement to *Sae-Mulli*, JKPS, and CAP. The other miscellaneous publications before the year 2002 can be summarized as follows: List of KPS Members (5 volumes), KPS Brochure (2 volumes), Benjamin W. Lee Memorial Lecture Series in Elementary Particle Physics (4 volumes), International Symposium on Condensed Matter Physics (5 volumes), Korea–China Symposium on Condensed Matter Physics (4 volumes), Korea Semiconductor Conference (4 volumes), Reports on the Physics Olympiad (6 volumes), KPS Bulletin (42 volumes), Physics Terminology (3 volumes), and other independent publications (18 volumes)

Conclusion

To summarize the publication activities of KPS, we present here the number of volumes and total pages, and the average number of articles published in journals and magazines during its first 50 years. Since *Sae-Mulli* was initiated in 1961, nine years later, the actual period of publication is 42 years.

Sae-Mulli: 18,235 pages in 201 volumes for 42 years, with an average of 13.3 articles/volume

JKPS: 18,925 pages in 167 volumes for 35 years, with an average of 19.0 articles/volume

Mulli Kyoyuk: 2,548 pages in 17 volumes for 18 years, with

an average of 8.5 articles/volume

CAP: 7,267 pages in 63 volumes for 15 years, with an average of 17.9 articles/volume

Total for all KPS Journals: 46,975 pages in 462 volumes (on average, more than 1,100 pages/ year).

Magazine: 6,839 pages in 86 volumes for 11 years

In addition to the above regular periodicals, KPS published supplements to *Sae-Mulli*, JKPS, and CAP. These activities can be summarized as follows:

Supplements to *Sae-Mulli*: 7 volumes with a total of 8,568 pages and 126 articles

Supplements to JKPS: 36 volumes with a total of 8,418 pages and 1791 articles

Supplements to CAP: 5 volumes with a total of 439 pages and 86 articles (Subtotal: 48 volumes with a total of 17,425 pages and 2003 articles)

KPS reached a world-class level in its publication activity by 2002, having issued five periodicals, including two journals listed by the ISI. Its achievements and development during its first 50 years rank as a real success story, since it began from a very unfavorable state of affairs, the latest starter even among Korean science societies. For example, the Korean Chemical Society was inaugurated in 1946, six years before the KPS,

and issued its first journal in 1949, 12 years earlier. KPS members and its teams of leadership should be highly praised for their resourceful and dedicated contributions to fulfilling their goals for societal advancement. Thus, one can expect KPS to continue its journey toward a brighter future befitting a world-leading physics organization.

Conflict of Interest

The author has been a member of KPS since 1964, and has participated in the society with many different roles, including editorial secretary, secretary general, vice-president, president (1988-1989), and as a member of the KPS Board of Directors. This article presents the author's personal opinion, not an official opinion of KPS.

Acknowledgments

The author wishes to acknowledge the help received from Prof. Choon Kyu Lee who read the manuscript and gave valuable advice. He is also indebted to Ms. Hyun Jeung Kim of Seoul National University and Ms. Hyeun Joo Lee of KPS for their secretarial assistance.

Appendix 1.

Instructions to authors for publication in the *Journal of the Korean Physical Society*

Article 1. (Classification of Papers)

- 1) Papers are classified as research papers, letters, brief reports, comments and replies, and review papers.
- 2) (Letters) Letters are papers of a short length with timely and important physical findings, and they are given priority in processing. The length of a Letter is limited to no more than four printed pages. A short memo describing the Letter's importance should be submitted with the manuscript.
- 3) (Brief Reports) Brief reports are the same as research papers, except that the length cannot be more than four printed pages.
- 4) (Comments and Replies) Comments include opinions on the papers already published. Replies include answers by the author(s) of the paper commented upon.
- 5) (Review Papers) After consulting with the Executive Editor and the Editorial Board members of the related subjects, the Editor-in-Chief can invite persons to submit Review Paper(s) without refereeing.
- 6) (Papers presented at an international conference, workshop or symposium) The manuscripts presented at a conference, workshop, or symposium may be submitted together to the *Journal of the Korean Physical Society* (hereafter referred to as JKPS) by the organizing committee who wish to publish them in JKPS as either a regular issue (in whole or part of an issue) or a supplementary issue. In this case, the organizing committee must send in a written application for the submission, available from KPS, to the Editor-in-Chief at least two months before the conference, workshop, or symposium. The Editor-in-Chief and the Executive Editor in charge of this matter will judge the appropriateness of the submission to JKPS, and the Editorial Board will make the final decision as to the permission.

Article 2. (Submission of Manuscripts)

- 1) Manuscripts should be submitted in triplicate (along with original figures and a diskette containing the file of the manuscript) to KPS by mail. Alternatively the submission can be made by electronic mail. It is recommended that the manuscripts be in the TeX format.
- 2) (Rapid Submission) The author(s) may make a rapid submission when s/he (they) want(s) to publish a manuscript in a shorter time period than usual, by also submitting a short memo describing the reason(s) and by paying a processing fee.

Article 3. (Language) The language of JKPS is English.

Article 4. (Format)

- 1) The manuscript should begin with the title and be followed, in order, by the names of the authors and their affiliations, the abstract, the PACS numbers, the electronic mail address, telephone and fax numbers of the principal author, the text, the references, the table captions, the tables, the figure (photograph) captions, and the figures (photographs).
- 2) The format of the proceedings of a conference, workshop, or symposium is the same as that of the regular JKPS issues. The name, date, venue, and the organizing committee of the conference, workshop, or symposium may be printed on the cover and/or inside the proceedings.

Article 5. (References)

- 1) Each reference should include, in the following order, the names of the authors, the name of the journal, the volume number, the starting page number, and the year of publication. Bold-face is used for the volume number, and the reference number is put in brackets []. When books are referred to, the reference should include, in the following order, the names of the authors, the name of the book, the publishing company, the place of publication, the year of publication, and the referenced section. All references should be located at the end of the manuscript [see *Sae mulli* (New Phys.) 14, 161 (1974)].

Examples:

- [1] H. K. Kim and D. H. Lee, J. Korean Phys. Soc. 29, 111 (1989).
- [2] H. K. Kim, D. H. Lee, and C. S. Park, J. Korean Phys. Soc. 29, 111 (1989).
- [3] S. J. Putterman, Superfluid Hydrodynamics (North-Holland, Amsterdam, 1974), Vol. 1, Chap. 1, pp. 100-102.
- [4] H. K. Kim, in Proceedings of the 1999 Spring Meeting of the Korean Physical Society, edited by D. H. Lee (Seoul, Korea, April 23-24, 1999), Vol. 1, pp. 100-102.
- [5] H. K. Kim, Saclay Report No. CEA-R5000, 1999.

- 2) The formal English titles of the journals of the KPS are as follows: JKPS: J. Korean Phys. Soc. 새 물리: Sae mulli (New Phys.) 물리교육: Mulli Kyoyuk (Phys. Teaching) 응용물리: Ungyong mulli (Korean J. Appl. Phys.) 물리학과 첨단기술: Phys. High Technol. CAP: Curr. Appl. Phys.

Article 6. (Tables and Figures)

- 1) The author(s) should indicate the desired placement of the tables and the figures (photographs) within the body of the

text by inserting their numbers at the appropriate locations.

- 2) The list of figure (photograph) captions should appear separately from the figures (photographs).
- 3) Figures should have the quality necessary for electronic publishing. Since figures are sized on the basis of their content and detail, the size of lettering should be chosen with this in mind. The figure number (or the title) should be placed outside the figure.

Article 7. (Notation of Units) Notation of units should follow the international convention [see Sae mulli (New Phys.) 38, 314 (1998)].

Article 8. (Galley Proofs) In principle, the proof-reading should be done by the author(s). The author(s) are not allowed to modify the text while checking the galley proofs.

Article 9. (Charges for Publication)

- 1) Authors are requested to pay a publication fee for a published paper. The author(s) are entitled to 50 reprints of the published paper. If additional reprints or special reprints are requested at the time of proof-reading, the authors must pay an additional fee according to the rules set by KPS.
- 2) When it is necessary to use high-quality paper(s) for publication, the cost will be charged to the author(s).
- 3) If the manuscript is submitted in a format other than the TeX format, a fee for the TeX conversion will be charged to the author(s).
- 4) The organizing committee of a conference, workshop, or symposium is responsible for the full coverage, in principle, of the cost for publication and distribution of the proceedings of the conference, workshop, or symposium. When the proceedings are published as a regular issue, the same number of copies as for the usual regular issue will be printed and distributed. When the proceedings are published as a supplementary issue, the number of copies will be the sum of the number requested by the organizing committee and that needed by KPS.

Article 10. (Copyright)

- 1) The principal author must provide a signed KPS copyright transfer form with the submission of a manuscript.
- 2) When requesting the publication of the proceedings of a conference, workshop, or symposium, the organizing committee must transfer the copyright to KPS. KPS will reserve the authority to republish and redistribute the proceedings as it becomes necessary.

Appendix 2.

Review Procedures for the *Journal of the Korean Physical Society*

Article 1. (Purpose) The following rules are to be applied for the review procedures for manuscripts submitted to the *Journal of the Korean Physical Society* (JKPS).

Article 2. (Acknowledgment)

- 1) After checking that the submitted manuscript is written according to the "1. Instruction to Authors for Publication in JKPS," the Editorial Office will assign an accession code and a secret code to the manuscript, and acknowledge the receipt of the manuscript to the corresponding author.
- 2) Manuscripts submitted to international conferences and published in a regular issue of JKPS must be received by the Editorial Office within a month after the conference, and the issues for international conferences are published within 6 months, as a principle, after the conference.

Article 3. (Referee Selection)

- 1) The Editorial Office will make a copy of the manuscript, and send it to an Editor in charge of the first PACS number. The copy will be sent to the Executive Editor, when the Editor is one of the authors of the manuscript. If the Executive Editor is also a coauthor of the manuscript, the copy will be sent to an Editor in charge of the second PACS number.
- 2) The person in charge of a submitted manuscript will select one referee and notify the Editorial Office of the referee list, and the Editorial Office will send the manuscript to the referees.
- 3) For a manuscript submitted as a Letter or a Rapid Submission, a referee will be selected by the Editor-in-Chief, the Executive Editor and an Editor in charge of the first PACS number. In this case, the referee will make a final decision as to the publication of the manuscript. The KPS pays a reviewing fee to a referee for a manuscript rapidly submitted.
- 4) When a referee is unable to review the manuscript, the Editorial Office will notify the person in charge of the manuscript, who will reselect a referee and notify the Editorial Office.
- 5) When the reselected referee is unable to review the manuscript, the Editorial Board will make a selection of another referee.

Article 4. (Referees' Reports)

- 1) The referee will be requested to send a referee's report to the Editorial Office within two weeks of reception of the manuscript.

- 2) After failing to receive the referee's report within two weeks, the Editorial Office will encourage the corresponding referee to send it promptly.
- 3) After failing to receive the referee's report within four weeks, the Editorial Office will notify the Executive Editor, who will make a selection of another referee according to Item III above.
- 4) The Editorial Office will send the reports received from the referee to the person in charge of the manuscript.

Article 5. (Review of the Referees' Reports)

- 1) The person in charge of the manuscript will review the reports from all the referees and make a recommendation to the Editorial Board as to the publication of the manuscript.
- 2) The Editorial Office will notify the referees' reports to the corresponding author of the manuscript for which a revision or a reexamination process is required.
- 3) The person in charge of the manuscript will review the revision of the manuscript, and make a recommendation as to the publication of the manuscript.
- 4) The revised manuscript for a reexamination will be sent to the referee who requested the revision, and the procedures of Item IV will be followed.
- 5) When the referees' opinion is in conflict with the author, the Editorial Board will select a judge and have the manuscript reexamined.

Article 6. (The Judge)

- 1) The judge will review the manuscript and all the materials concerning the review process, and make a final decision and give a recommendation to the Editorial Board as to the publication of the manuscript.
- 2) The judge can request a revision of the manuscript, and re-examine the revised manuscript.

Article 7. (Final Decision)

- 1) The Editorial Board will make final decisions concerning the publication of manuscripts for which recommendations were made by the person in charge of the manuscript.
- 2) When a final decision is made for the publication of a manuscript, the Editorial Office will notify the corresponding author of the decision as well as of the expected volume

and issue numbers.

- 3) When a final decision is made against the publication of a manuscript, the Editorial Office will notify the corresponding author of the decision as well as of the referees' reports.

Article 8. (Report of the Review Work)

- 1) The person in charge of the manuscript is expected to make a monthly report of the review work to the Editorial Board.
- 2) The Editorial Office is required to regularly report on the review processes to the Executive Editor.

Article 9. (Commission of the Review Processes)

- 1) When the organizing committee of an international conference, workshop, or symposium requests to publish the manuscripts submitted to the conference, workshop, or symposium as a regular issue of JKPS, the Editorial Board will make a decision whether or not to commission the review processes to the organizing committee, and the decision should be made at least two months before the conference, workshop, or symposium.
- 2) The organizing committee of an international conference, workshop, or symposium should make a separate review committee including more than one Editor of KPS and have it follow these review procedures.

Article 10. (Review Work of the Editorial Board) The Editorial Board will make decisions on the following.

- (a) Selection of referees when the person in charge of the manuscript fails to select them
- (b) Selection of a judge according to Item V(e)
- (c) Publication of the submitted manuscripts.
- (d) Whether or not to commission the review processes of the manuscripts submitted to an international conference, workshop, or symposium to the organizing committee.

Article 11. (Perusal of the Review Processes) The Editorial office should regularly post the results of review processes on the Internet Homepage of KPS and the authors of the manuscripts may peruse the review processes using the manuscript accession code number and the secret code number.

Increasing number of authors per paper in Korean science and technology papers

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Abstract

We examined changes in the number of authors per paper for science and technology papers (agricultural sciences, engineering and technologies, medical sciences, and natural sciences) in Korea. We employed the Scopus database to examine the change in the number of authors in papers, which were published from 2000 to 2015 in the 234 Korean academic journals indexed on Scopus. We found that the global trend of growth in the number of authors per paper is evident in Korea as well. While there was little evidence of a correlation with the citation per paper, a positive correlation was found between with the field-weighted citation impact, another measure of a paper's impact, in medical and natural science papers. In terms of the type of collaboration, we found that international collaboration papers had the highest number of authors, followed by national and institutional collaborations. The number of authors per paper was highest for those published in the top 10% journals by Source Normalized Impact per Paper, followed by Scopus-indexed journals, while papers published in Korea Citation Index had the lowest number of authors per paper. We propose that the rise in the number of authors per paper in Korean papers may be ascribed to many Korean research programs encouraging group research and the widespread availability of the internet, which has stimulated joint research efforts and encouraged international collaboration.

Keywords

Author; Collaboration; Paper; Science; Technology

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Introduction

The number of papers in science and technology has increased every year, with growing co-authored papers from 42% of the world's total science and technology articles in 1990 and 67% in 2010, with an annual growth rate of 4.4% in the number of authors per paper [1,2]. Korea has also seen a 20% increase in the number of science and technology papers over the past five

years [3]. The definition, rights, and responsibilities of authorship have recently been the topic of active discussion in the international arena, and the growth in the average number of authors per paper is frequently noted [4]. Based on SCI archives, the average number of authors per science and technology paper in the US rose from 3.2 in 1990 to 5.6 in 2010 [1]. Meanwhile, an analysis of data from Scopus, which encompasses all academic fields, including the humanities, social sciences, and natural sciences - suggests that the average number of authors rose from 3.4 in 2003 to 4.15 in 2013. This rise was accompanied by a decrease in the proportion of papers by single authors, from 20% to 13% [5]. These widely-observed trends have been attributed to the growth of knowledge creation, joint international research and transfer and sharing of knowledge among research institutes and governments [4,6,7].

Is the worldwide phenomenon of an increase in the average number of authors per paper also occurring in Korea? If so, is it connected to unethical practices among researchers [8] or to the environment within which research is conducted? Such questions need to be addressed in order to determine whether this rise is part of a general phenomenon associated with the way in which academic research is currently conducted around the world. Recently, Huang et al. [9] reported that research collaboration, measured by the number of coauthors, the number of fields, and the number of countries, has increased significantly in the post-web stage compared with the pre-web stage. The empirical results suggest that the Internet facilitates communication among scholars.

In this study, we examine changes in the number of authors per paper for science and technology papers (natural sciences, engineering and technologies, medical sciences, and agricultural sciences) in Korea over the years from 2000 to 2015. We also examine whether the change in the number of authors is related to research impact of the papers (domestic, international, and papers in top 10% journals), the field of research, the number of citations, and the practice of joint research (projects jointly undertaken by domestic and international research institutes).

Methods

We employed the Scopus database to examine the change in the number of authors per paper. Two datasets were used for the analysis (Table 1): the first dataset comprised papers published from 2000 to 2015 in the 234 Korean academic journals published by Korean academic societies; the second dataset comprised papers by authors who are affiliated with Korean research institutes in the top 10% of journals in terms of the Source Normalized Impact per Paper (SNIP, measures contextual citation impact by weighting citations based on the total number of citations in a subject field) index provided by Scopus. The relevant papers were downloaded from Scopus. The number of authors for each paper was recorded, as well as the academic Subject area according to the Organization for Economic Cooperation and Development classification scheme covering the agricultural sciences, engineering and technologies, medical sciences, and natural sciences. In papers published in the 234 Korean journals, Koreans accounted for 77.4% of the authors (distribution of authors by nationality: South Korea 77.4%, China 10.4%, United States 6.6%, Japan 4.0%, India 4.0%, Iran 2.7%, Turkey 1.8%, Taiwan 1.3%, Australia 1.2%, and United Kingdom 1.1%). Thus, the majority of papers in the Scopus indexed Korean journals were authored by Koreans.

Results

Number of authors compared by subject area and form of collaboration

From 2000 to 2015, number of authors per paper in the 234 Korean journals on Scopus has grown gradually at an average rate of 0.9%. The average number of authors was highest in 2011, at 4.7, while the figure for 2015 was 4.4 (Fig. 1A). Based on the form of collaboration, joint research works may be classified as international, national, institutional, single authorship (non-joint research). Considering the number of co-authored papers by subject area (regardless of form of collaboration), papers in the medical sciences had the highest number of co-authors, averaging approximately 5.0 in the period of 2000 to 2015. The average number of authors was 4.7 in the

Table 1. Scopus dataset description

	Subject classification	Year/document type	Coverage
Dataset 1	Classification based on the Organization for Economic Cooperation and Development's field of science and technology:	Papers in the Scopus database from 2000 to 2015	Papers in the 234 Korean journals indexed on Scopus
Dataset 2	agricultural sciences, engineering and technologies, medical sciences, natural science	Downloaded January 25th, 2016	Papers authored by Korean researchers in the top 10% journals by Source Normalized Impact per Paper

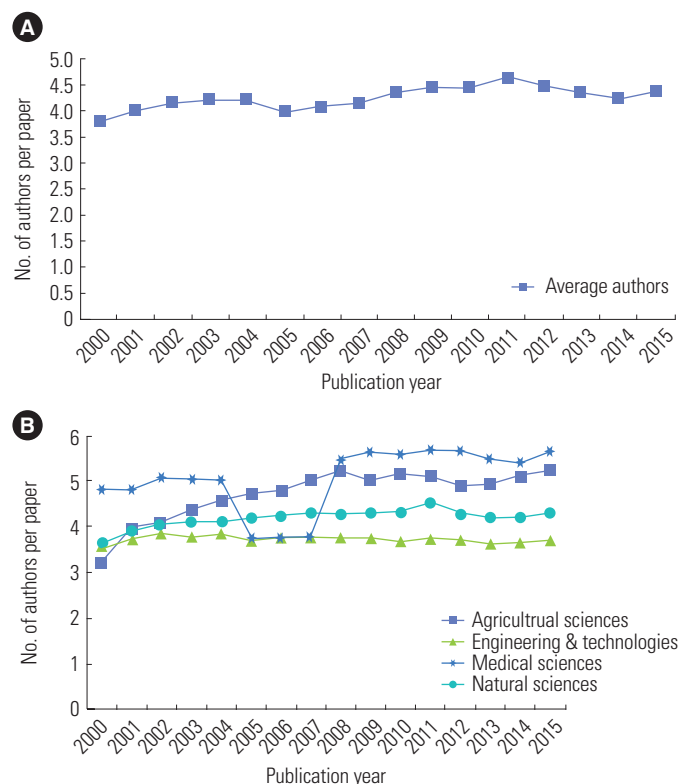


Fig. 1. (A) Changes over time in the number of co-authors in Korean journals: 4 subject areas. (B) Number of co-authors by subjects and year.

case of agricultural sciences, 4.2 in the natural sciences, and 3.7 in engineering. Thus, the number of authors per paper in the medical sciences averaged more than 1.3 times that in engineering.

The number of authors per paper in the medical sciences decreased to an average of approximately 3.7 from 2005 to 2007, before increasing sharply after 2008. Since 2003, the Korean Association of Medical Journal Editors has stressed research ethics in workshops and has continued to focus on these issues. This may be associated with the 2005 scandal over the paper by Hwang Woo-Suk, which became the subject of social scrutiny due to the inclusion of a co-author not fit for authorship. After the Lee Myung-Bak administration took office in 2008, the government vowed to commit 5% of the national budget to research and development efforts. This is considered to have led to a sharp rise in joint research, including research projects spanning multiple institutes. Meanwhile, in the field of engineering, the number of authors has remained more or less stable at 3.7 throughout the 15 years studied here (Fig. 1B).

Considering the number of co-authors in terms of the form of collaboration, national collaborations led to the most authors per paper, followed by international and institutional

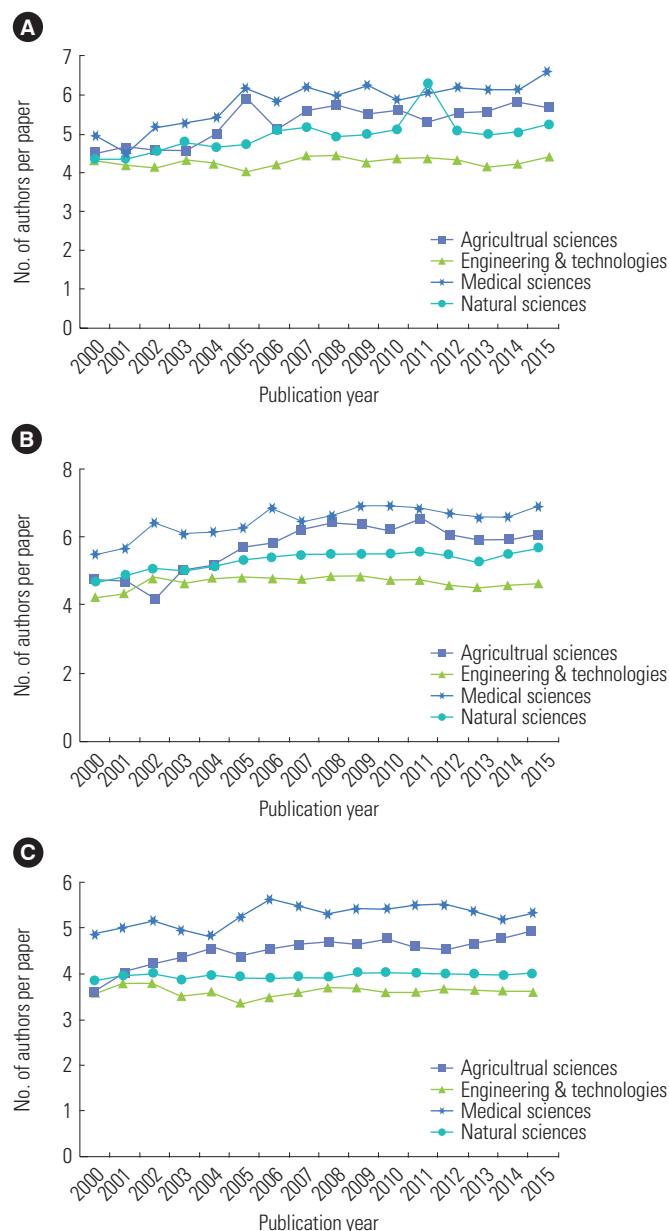


Fig. 2. (A) Changes over time in the number of co-authors by subject area: international collaboration. (B) Changes over time in the number of co-authors by subject area: national collaboration. (C) Changes over time in the number of co-authors by subject area: institutional collaboration.

collaborations. This ordering was observed regardless of subject areas (Fig. 2). National collaboration papers in the medical sciences had the highest average number of co-authors (6.9), followed by international collaboration papers in the medical sciences (6.6 co-authors) and national collaboration papers in agricultural sciences (5.7 co-authors).

The number of papers published over the past 15 years has grown at an annual average rate of 12.3%. Considering only

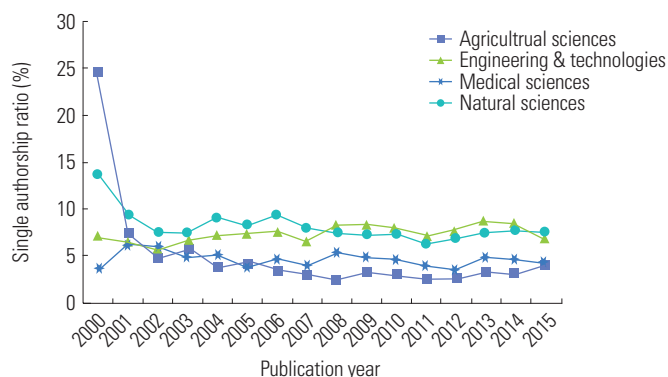


Fig. 3. Changes over time in the ratio of single authorship by subject area.

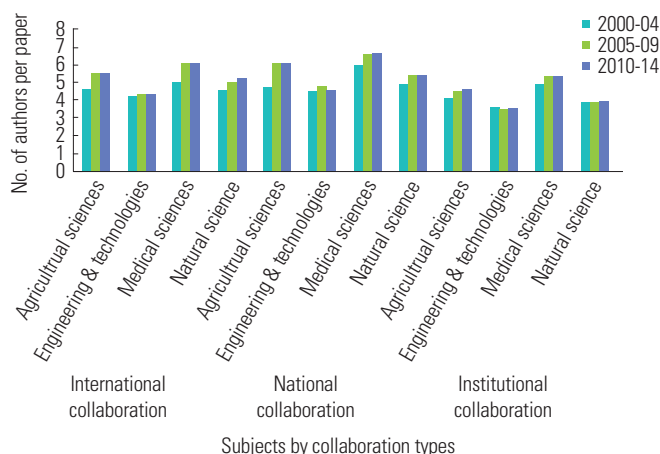


Fig. 4. Comparison of the number of authors by types of collaboration (3 periods of 5 years).

those papers with single authorship, the growth rate is 6%. Because the number of authors is fixed at one in the case of single authors, it is more meaningful to analyze the ratio of papers with single authors than the gross number of papers (Fig. 3). While this ratio was very high in the agricultural sciences in 2000 (at 24.7%), it fell to an average of 5.0% from 2000 to 2015. The ratio of single authorship is 7.3% in engineering, 4.7% in the medical sciences, and 8.1%, the highest, in the natural sciences. In terms of average growth rates, the single authorship ratio has grown at 0.9% in the medical sciences, while decreasing in other fields at rates of -11.2% in agricultural sciences, -0.2% in engineering, and -4.0% in natural sciences, respectively. These downward trends have also been observed internationally [6].

The field of natural sciences has the highest ratio (and the highest gross number of papers) of single authorship. Breaking this down in terms of fields of study reveals that the high ratio overall is due to a high ratio of single authorship in mathematics, namely 29.3%. This is due to the nature of academic research in mathematics, where there is less need for

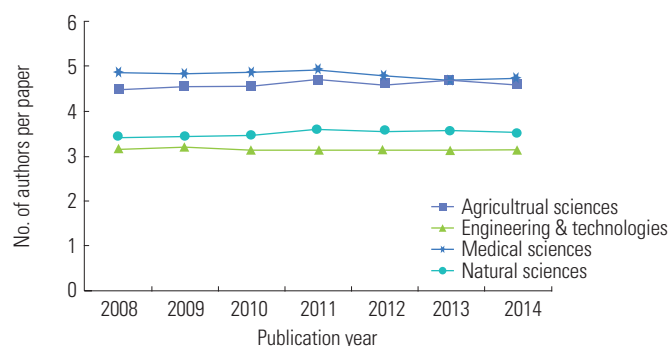


Fig. 5. Comparison of the number of authors per domestic research paper (Korea Citation Index-indexed journals).

supporting personnel (such as graduate students) or joint research in comparison to other disciplines, as research is driven mainly by the ideas and mental capacities of individuals.

Analysis of the average number of authors per paper over the years from 2000 to 2015 in terms of three periods of five years yields Fig. 4 below. Over the three periods, the average number of authors grew most rapidly (13.3%) in national collaborations in agricultural sciences, followed by international collaborations in medical sciences (9.7%) and international collaborations in agricultural sciences (9.6%). The lowest growth rates were observed in engineering, including institutional collaborations (-0.5%), international collaborations (0.4%), and national collaborations (0.7%). The overall growth rate throughout the 12 types of collaboration over the three periods was 5.3%, with gradual positive growth observed for all types of collaboration except institutional collaborations in engineering and technologies, which fell by 0.5%.

Meanwhile, comparing the number of authors per paper for domestic papers registered on the Korea Citation Index (KCI) reveals no significant changes across the years 2000 to 2015, with somewhat fewer co-authors relative to foreign journals registered on Scopus (Fig. 5). The difference in the number of co-authors is about one author in the medical sciences, 0.72 in the natural sciences, and 0.56 in engineering and technologies.

The number of authors published in the top 10% journals by SNIP

Analysis of the number of authors of Korean papers published in the top 10% of SNIP journals indexed on Scopus during 2000 to 2015 led to the following findings.

The number of authors per paper in the top 10% journals by SNIP by types of collaboration

Comparing the ratio of Korean papers published in the top 10% journals of SNIP registered on Scopus from 2000 to 2015

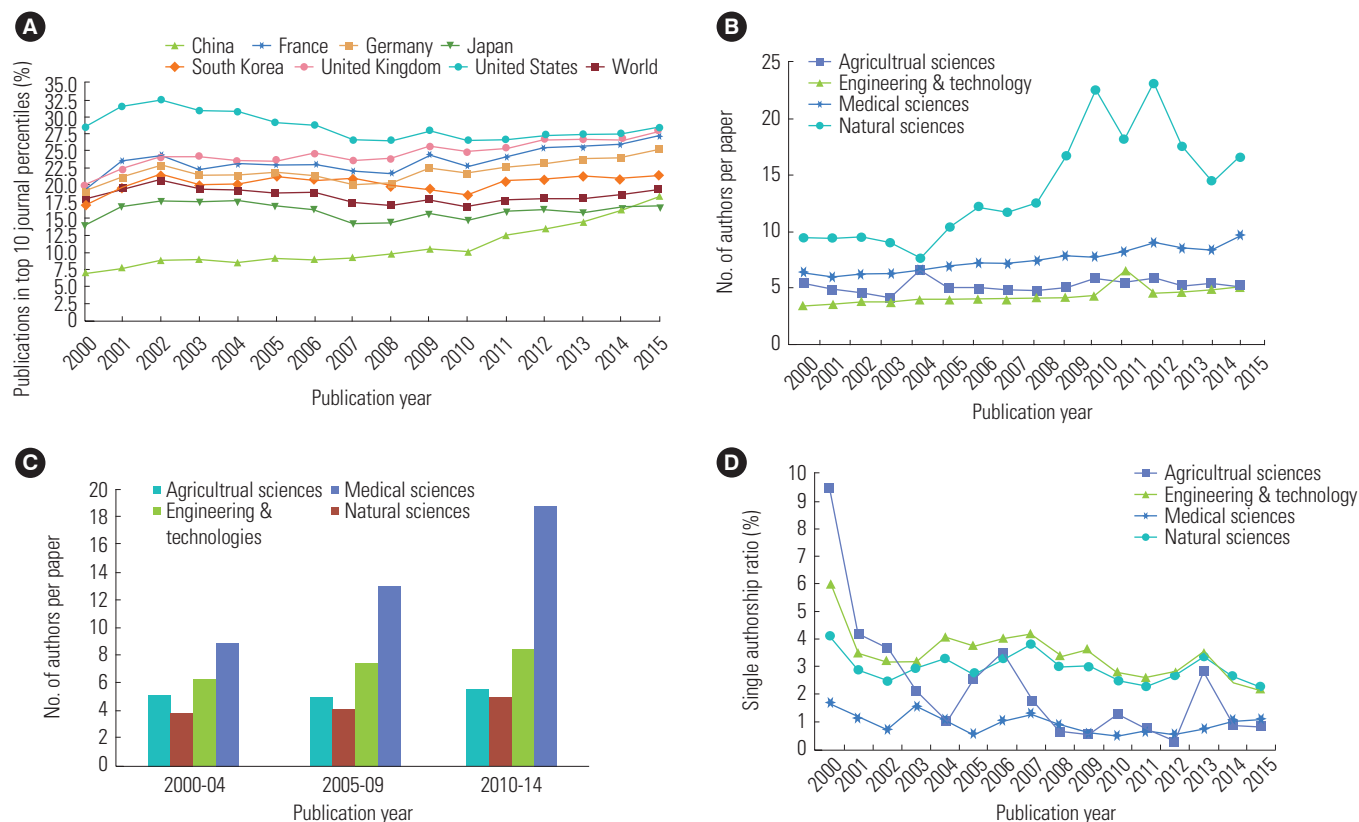


Fig. 6. (A) Rate of publication in the top 10% journals by Source Normalized Impact per Paper (SNIP) (selected nationalities). Publication type of articles only included. (B) Average number of authors per paper in the top 10% journals by SNIP by subject area. (C) Number of authors by subject area (3 periods of 5 years). (D) Ratio of single authorship papers published in the top 10% journals by SNIP.

reveals that, compared to the worldwide average and researchers from Japan or China, Korean researchers had a higher rate of publication in such journals (Fig. 6A).

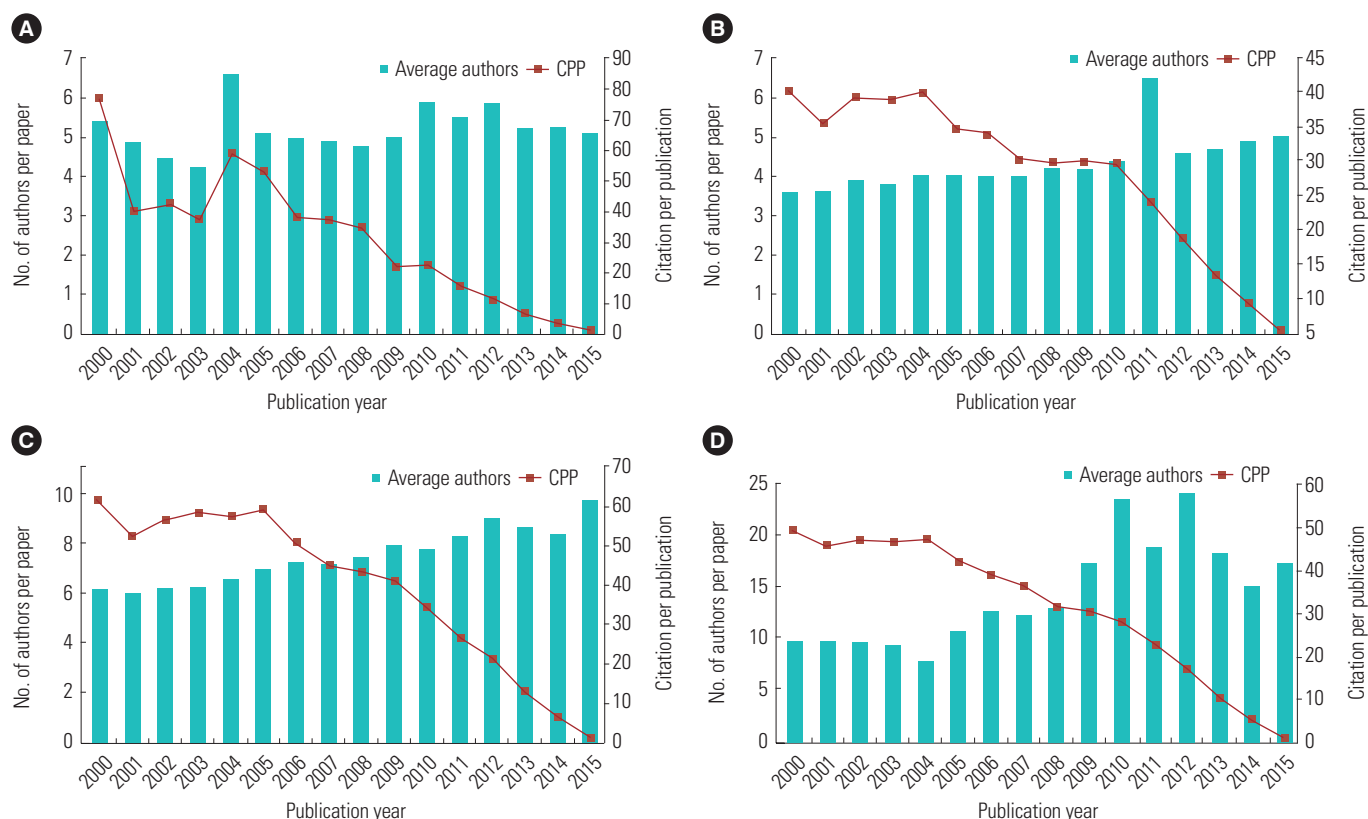
Considering the average number of authors per paper in the four subject areas over the years 2000 to 2015 reveals diverse characteristics across fields (Fig. 6B). In particular, papers in the natural sciences reflected the most changes and the highest average number of co-authors, for example, 23.1 in 2012 and 15.5 in 2015. This may be explained by the characteristics of research in physics, in which large-scale projects involving a large number of researchers such as the European Organization for Nuclear Research (CERN) project and other consortiums are common. There have been instances of author groups in physics with a maximum of 5,154 authors [10], and the existence of such large-scale projects may have contributed to the higher average number of authors in physics and the natural sciences in general. Data analysis reveals that the number of authors in agricultural science papers has remained stable, while engineering, medical sciences, and natural sciences have reflected average annual growth rates of 2%, 3%, and 4%, respectively.

Fig. 6C depicts the average number of co-authors per paper in the four fields of study over the three periods of five years. The number of co-authors has grown steadily in all fields except agricultural sciences, with the number rising from 3.8 in 2004 to 5.0 in 2014 in the case of engineering, from 6.3 in 2004 to 8.4 in 2014 in the medical sciences, and from 8.9 in 2004 to 18.8 in 2014 in the natural sciences. Among 4 subject areas, engineering and technologies papers had the lowest number (4.6) of co-authors.

Analyzing the average number of authors by types of collaboration (international, national, and institutional) reveals that the highest numbers of co-authors were found for international collaboration papers (Table 2). International collaborations in the natural sciences reflected the highest number of authors per paper (32.5), followed by international collaborations in the medical sciences (10.8), and national collaborations in the medical sciences (7.5). Meanwhile, institutional collaborations yielded papers with the smallest numbers of co-authors, particularly in the fields of engineering and technologies (3.6), natural sciences (3.8), and agricultural sciences (3.9).

Table 2. Comparison of the average number of authors for papers published in the top 10% journals by Source Normalized Impact per Paper by types of collaboration

Year	International collaboration				National collaboration				Institutional collaboration			
	Agricultural sciences	Engineering & technologies	Medical sciences	Natural sciences	Agricultural sciences	Engineering & technology	Medical sciences	Natural sciences	Agricultural sciences	Engineering & technology	Medical sciences	Natural sciences
2000	5.5	4.0	7.3	19.2	2.0	4.1	6.2	4.7	8.8	3.3	5.7	3.7
2001	4.8	3.7	6.2	20.5	4.8	4.2	6.5	4.9	5.5	3.5	5.8	3.8
2002	4.6	4.1	6.3	20.9	6.8	4.4	6.8	5.1	3.2	3.6	6.1	4.0
2003	4.3	4.1	6.8	17.5	5.3	4.3	6.5	4.8	3.3	3.5	5.7	3.5
2004	10.0	4.5	7.4	13.6	4.7	4.6	6.7	4.8	3.9	3.5	5.9	3.5
2005	5.5	4.3	7.5	19.6	5.7	4.6	7.2	5.2	3.8	3.4	6.2	3.8
2006	5.2	4.3	8.5	23.9	5.8	4.5	7.3	5.1	3.8	3.4	6.1	3.8
2007	4.9	4.4	8.4	23.1	5.7	4.6	7.4	5.3	4.1	3.4	5.8	3.8
2008	4.9	4.5	9.2	26.0	5.2	4.9	7.7	5.3	3.9	3.6	5.7	3.8
2009	5.9	4.9	10.5	36.1	5.7	4.6	7.4	5.1	3.5	3.5	6.0	3.7
2010	7.1	5.1	9.9	50.0	6.2	4.9	7.7	5.4	3.8	3.5	5.8	3.7
2011	6.1	10.6	10.6	37.9	6.1	5.2	7.9	5.6	3.9	3.6	6.1	3.8
2012	6.5	5.3	12.6	47.9	6.6	5.1	7.9	5.6	4.2	3.6	6.0	3.8
2013	5.6	5.7	11.8	37.6	6.3	5.0	7.7	5.5	3.9	3.6	5.9	3.7
2014	5.9	5.9	11.5	29.7	5.9	5.3	7.4	5.6	3.9	3.7	5.6	3.8
2015	6.0	6.0	14.7	34.8	6.0	5.6	8.0	5.9	3.6	3.8	5.9	3.9
Average	5.9	5.6	10.8	32.5	6.0	5.0	7.5	5.4	3.9	3.6	5.9	3.8

**Fig. 7.** Comparison of the number of authors and citations per publication (CPP). (A) Agricultural sciences, (B) engineering and technologies, (C) medical sciences, and (D) natural sciences.

Single authored papers published in the top 10% journals by SNIP

The proportions of single-author papers are summarized in Fig. 6D, showing an average of 2.3% in agricultural sciences, 3.5% in engineering and technologies, 1.0% in medical sciences, and 3.0% in natural sciences. In the case of the top 10% journals by SNIP, the share of single-author papers was revealed to be low as compared to 234 Korean academic journals. While the subject area with the most single-author papers in these journals was engineering and technologies (3.5%), limiting the analysis to the 234 Korean journals reveals that the most single-author papers were in the natural sciences (8.1%). The average difference in these proportions of single-author papers in Korean and SNIP journals by subjects was found to be 3.8%. This may be explained by the fact that far more co-authored than single-author papers are submitted to top journals. The increase in the number of co-authored papers has been observed globally as well [11].

The relationship between papers' impact and number of authors

The relationship between the number of authors and citations per publication

Might the number of authors of a paper be related to its im-

pact, in terms of how often it is cited? If these two factors are observed to be correlated, then the recruitment of co-authors may affect a paper's potential impact. The graphs in Fig. 7 plot the number of authors per paper against the citations per publication (CPP). As is clear from these figures, there appears to be no significant correlation between the number of authors and the CPP. The downward annual trend in the CPP is probably due to the fact that newly written papers tend to cite older papers, resulting in higher citations for older papers and fewer citations for newer papers.

The relationship between the number of authors and the field weighted citation impact

Comparison of the correlations between the number of authors and the field weighted citation impact (FWCI; divides the number of citations received by a publication by the average number of citations received by publications in the same field, of the same type, and published in the same year) in the four subject areas shows that the FWCI tends to be higher for papers with more authors in the fields of medical and natural sciences (Fig. 8). However, this effect was not substantial in the fields of agricultural science and engineering and technologies. While various factors other than the number of authors must be considered, further enquiry into this issue remains

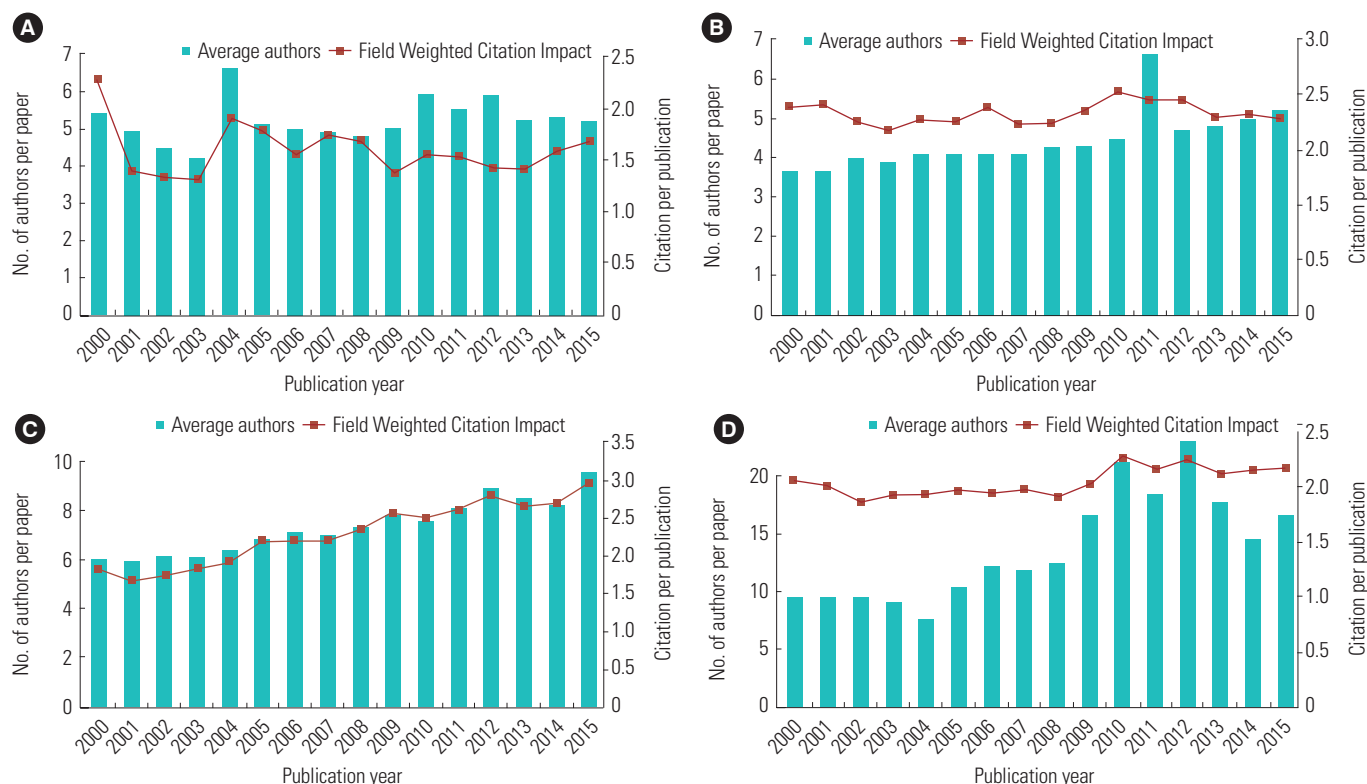


Fig. 8. Comparison of the number of authors and field weighted citation impact (FWCI). (A) Agricultural sciences, (B) engineering and technologies, (C) medical sciences, and (D) natural sciences.

for future research, as the present paper focuses on the effects of the number of authors.

Discussion

The number of papers published in the 234 Korean journals indexed on Scopus increased at an average annual rate of 12.3% from 2000 to 2015, while the number of papers written by authors who are affiliated with universities in Korea and published in international journals grew by 20.7% from 2010 to 2015 [3]. Meanwhile, the average number of authors per paper grew steadily at an average rate of 0.9% from 2000 to 2015. While the proportion of single authorship papers grew by 0.9% in the case of medical sciences, in the fields of agricultural sciences, engineering and technologies, and natural sciences reflected negative growth rates of -11.2%, -0.2%, and -4.0%, respectively. In terms of the number of authors per paper and the FWCI in the four subject areas, a positive correlation was revealed for medical and natural science papers. However, no substantial correlation was observed for agricultural sciences and engineering and technologies. The upward trend in the number of authors per paper is evident in Korean-authored papers and foreign journals. In the discussion below, we consider a range of factors in the Korean context to determine a possible explanation for these phenomena.

Subject areas and number of authors

Analysis of the average number of authors per paper reveals differences between subject areas (Fig. 1B, 2B). In particular, the natural sciences have seen the largest changes, as well as the highest average number of authors per paper. This may be explained by two factors. First, there is the changing research environment in Korea. Comparing papers published in top 10% journals by SNIP in terms of nationality, Korean researchers had a higher share relative to the worldwide average, as well as to the shares of Japanese and Chinese researchers (Fig. 6A). Research subsidies by the Korean government are a major factor behind this finding. The Korean government has placed emphasis on the natural sciences and pursues subsidy programs such as Brain Korea 21 (1999-2007, 2008-2012) and the World Class University (2008-2012), directed at high-performing universities, leading to larger research teams and more participants in writing research papers. As a result, the Korea's ranking in terms of the total number of papers indexed by Scopus reflected an upward trend from 19th place in 1996, 16th in 1999, 14th in 2001 to 13th place in 2004. Since 2006 year, Korea has maintained 12th place based on scholarly output.

Another factor is the influence of international collaboration. Large-scale projects like CERN and other consortium-

led projects fall into this category, and involve a large number of researchers. Worldwide trends toward 'big science' and the emergence of large-scale research projects have encouraged the growth of joint research projects through international collaboration. There are as many as 171 papers in the natural sciences (such as physics papers published in *Physical Review Letters*, *Physics Letters*, the *Journal of Instrumentation*, etc.) with more than 2,000 co-authors, while more than 12,000 researchers from 70 nations are a part of the CERN's Large Hadron Collider consortium [12]. These factors naturally influence the growing number of authors in these fields. It has been reported that co-authorship encourages the chance of citation, and that international collaborations tend to have better indicators of impact that generic co-authored papers [13].

National vs. international papers and number of authors

The number of authors per paper was shown above to be the highest in papers published in the top 10% journals by SNIP, followed by those indexed on Scopus, and lowest in papers in the KCI (Figs. 1, 3, 5, 9). This may be due to the fact that multiple researchers are brought in to collaborate to ensure research quality before submitting to top journals. On the other hand, researchers may find that submission to and publication in KCI-indexed journals are less competitive than in the case of top journals or Scopus-indexed journals, thus leading to a lower numbers of co-authors. While various interpretations are possible, different researchers do tend to target different journals (e.g., those registered on the Web of Science, Scopus, and the KCI) and may therefore participate in collaborative teams of various sizes.

On a more practical note, many researchers at Korean institutions tend to favor publication in foreign journals, which increases their chances of promotion and other awards. Furthermore, participant researchers tend to be concerned about

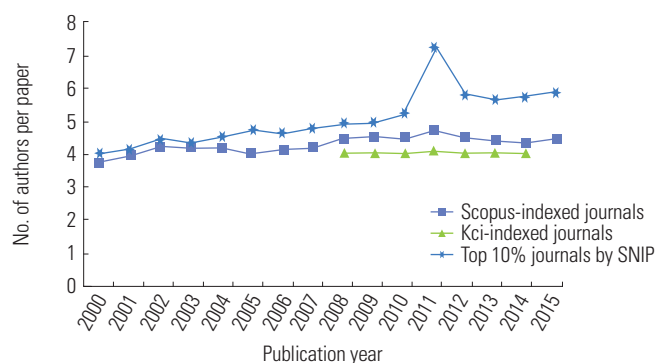


Fig. 9. Comparison of number of authors per paper (Scopus-indexed journals, Korea Citation Index-indexed journals, and top 10% journals by Source Normalized Impact per Paper).

the number of papers they are able to publish. In particular, younger researchers tend to be more concerned with promotions, tenure, contract extensions, and awards. There tends to be fierce competition for research funding provided by government-funded research institutions, and such research funding depends upon researchers having adequate credentials. Performance assessments within research institutions place priority and greater weighting on papers published internationally (in Web of Science or Scopus-indexed journals), and leading journals like *Nature* express no concern about papers having many authors. The recently released “Study on academic research and development activity in Korea,” reports that, during the past five years, papers in the fields of natural science, engineering and technologies, medical science, and agricultural science published in SCI journals outnumbered those published in domestic (KCI) journals by two to three times [3].

Regarding the hypothesis that there is a quality difference between papers published in domestic journals and those published in foreign journals, we analyzed the number of authors per paper of papers published in domestic (KCI) and the top 10% journals by SNIP. Is the number of authors of frequently-cited (i.e., high-impact) papers increasing? As mentioned above, the correlation between a paper’s number of authors and its impact may be of interest; if a positive correlation exists, bringing in multiple authors may potentially result in a higher-impact paper. However, the correlation between the number of authors and the CPP, one measure of impact, was found to be insubstantial (Fig. 7). Furthermore, comparisons of the number of authors per paper and the FWCI, another measure of impact revealed a positive correlation in the case of medical and natural science papers, but none for agricultural sciences and engineering and technologies (Fig. 8).

Meanwhile, in terms of types of collaboration, papers prepared through international collaboration were found to have the highest number of authors (Table 2). These results would be related to two types of environmental factors for internally and externally: (1) the internal environmental factor is that the Korean governmental research direction is to emphasize collaborative research, group research programs such as the advanced research center programs, Global Research Lab and others during the last 10 years [3]. (2) the external environmental factor, the availability of the internet has greatly stimulated joint research efforts, encouraging collaborative research and international collaborations as reported by others [7,9,14]. It has been also reported that improved communications (the Web, Skype, cheaper travel) is one of factors for the huge increase in international scientific collaboration [13].

Number of authors and ethical considerations

Along with the rising number of authors of single research papers, the number of guest and ghost authors has also risen [15]. This phenomenon is part of a global trend, and the growth in the number of guest authors and honorary/gift authors has led to calls for greater transparency and accountability regarding the contributorship of coauthors [16]. This study lacked objective data regarding growth in the number of authors and accompanying ethical considerations. However, as discussed above, the Korean preference for international publications and growth in the number of authors may have partially been influenced by the practice of inviting guest or gift authors.

Realistically, even in the event that a particular contributor to a paper considers an author’s contribution to be too minor to report, a journal editor may find it difficult to restrict a first author who lists 10 researchers, insisting that all are eligible as coauthors, unless an explicit upper cap is set in the submission regulations. Korean journals have not yet adopted an accountable contributorship system. While all research institutions state the four requirements for authorship in their research ethics guidelines, these are not particularly realistic [17]. While regulations strictly restrict the roles of authors, the internal workings and roles of each author are not externally observable, making it possible to include as many coauthors as one wishes. In the case of papers in the medical sciences, while an author might be held accountable for the findings of a paper, an author is not held accountable to the same degree when the findings are applied to patient care with adverse outcomes. This is because not all medical research papers are immediately connected to patient treatment. Thus, it is rare for an author’s accountability to lead to a socially problematic issue.

In conclusion, we found that the global trend of growth in the number of authors per paper is evident in Korea as well. While there was little evidence of a correlation with the CPP, one measure of a paper’s impact, a positive correlation was found between with the FWCI, another measure of a paper’s impact, in medical and natural science papers. In terms of the form of collaboration, we found that international collaboration papers had the highest number of authors, followed by domestic and within-institute collaborations. The number of authors per paper was highest for those published in the top 10% journals by SNIP, followed by Scopus-indexed journals, while papers published in KCI-indexed journals had the lowest number of authors per paper. We propose that the rise in the number of authors per paper in Korean papers may be ascribed to many Korean research programs encouraging group research and the widespread availability of the internet, which has stimulated joint research efforts and encouraged interna-

tional collaboration.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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Patterns of citation when Korean scientists cite other Korean scientists

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Abstract

Citation patterns of Korean scientists are investigated by analyzing the references of the papers authored by Korean chemists and published in two journals of different standing. Particular interest is given to how frequently Korean researchers quote the papers written by other Korean researchers and whether there is any difference in the citation pattern when Korean researchers publish their papers in a top international journal or in a domestic journal. Two journals in the category of multidisciplinary chemistry, the *Journal of the American Chemical Society* and the *Bulletin of the Korean Chemical Society*, are chosen and a detailed analysis of the references of the papers written by Korean authors in 2015 was performed. The author self-citation rate is found to be much larger than the citation rate of other Korean authors. It is also found that the percentage of self-citations and the percentage of the references by Korean authors excluding self-citations are both significantly larger in the *Bulletin of the Korean Chemical Society* than in the *Journal of the American Chemical Society*. Interpretations of the results based on social exchange theory are proposed.

Keywords

Citation pattern; Reference selection; Self-citation; Social exchange theory

Introduction

References of journal papers play an all-important role in connecting them to a large group of other academic papers. By connecting papers through their references, one can form a huge and complex network of papers. Analyses of this complex network may provide useful information on the evaluation of individual journals and researchers and on the social interaction among researchers at a global scale. The process of reference selection is not entirely academic, but is also influenced by social and psychological factors. In this paper, we investigate some socio-psychological aspects involved in the reference selection process by analyzing the references of the papers authored by Korean chemists which were published in two journals of different standing.

We are particularly interested in how frequently Korean researchers quote the papers written by other Korean researchers. More specifically, we want to ask whether there is any

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difference in the citation pattern when Korean researchers publish their papers in a top international journal or in a domestic journal. For that purpose, we choose two journals in the category of multidisciplinary chemistry, the *Journal of the American Chemical Society* (JACS) and the *Bulletin of the Korean Chemical Society* (BKCS). Chemistry and physics are two representative disciplines where a substantial number of papers written by scientists in Korea are published in top international journals. We have chosen chemistry because, in physics, data analysis becomes complicated due to the papers in experimental high energy physics with an extremely large number of authors [1].

JACS is a top chemistry journal with a very high impact factor and reputation, while BKCS is a Korean chemistry journal listed in the SCI (Science Citation Index) with a relatively low impact factor. Authors of BKCS articles are mostly Koreans. We perform a detailed analysis of the references of the papers written by Korean authors, which were published in JACS and BKCS in 2015. We find some interesting characteristics of how these authors cite the papers written by other Korean authors and notice clear differences between JACS and BKCS.

Methods

The total number of the papers the author lists of which include at least one Korean author and which were published in JACS in 2015 was 70. By ‘Korean’ authors, we mean those who are ethnically Korean and are working in Korean institutions. Ethnically Korean authors working in foreign institutions are excluded. For these 70 papers, we looked up the reference sections and counted the number of all references and that of the references authored by at least one Korean researcher in a Korean institution. This latter number was broken down into the number of self-citations, corresponding to the case where at least one Korean author of the citing paper is also among the authors of the reference, and the number of the references written by at least one Korean author, which are not self-citations. We emphasize that the term ‘self-citation’ is used to mean ‘author self-citation’ rather than ‘journal self-citation’ in this paper.

A similar analysis was done for the papers published in BKCS in 2015. This journal publishes three types of papers: regular articles, communications and notes. For a direct comparison with JACS, we selected all 110 regular articles published in the February (30), April (23), June (20), August (21), and October (16) issues and analyzed their reference sections in the same way as in the previous case. We also performed an independent samples t-test to examine differences between the two data sets, using IBM SPSS ver. 22

(IBM Co., Armonk, NY, USA).

Results

The results of our analysis are summarized in Table 1. The average number of references per paper for the 70 papers in JACS is 55.43, whereas that for the 110 papers in BKCS is 30.98. The standard deviations are 22.92 and 14.49 respectively. It is interesting to note that the papers in JACS have a substantially larger number of references, though both journals are in the same category and the considered papers are of a similar type. It may be the case that authors make much more effort to write the reference section when they publish their papers in JACS than in BKCS.

The average number of self-citations per paper is 3.89 for the JACS papers and 4.11 for the BKCS papers. The latter number is slightly higher, though the difference is small. The standard deviations, which are 3.97 and 5.91 respectively, are very large, being larger than the mean values. This is because there are a relatively small number of papers with a very large number of self-citations. The percentage of self-citations among all references is 7.01% for the JACS papers and 13.26% for the BKCS papers. We note that this number for the BKCS papers is especially high. The self-citation rate for the BKCS

Table 1. Summary results

Category	JACS	BKCS
Total number of papers analyzed (n)	70	110
All references		
Total	3,880	3,408
Mean	55.43	30.98
SD	22.92	14.49
Self-citations		
Total	272	452
Mean	3.89	4.11
SD	3.97	5.91
Percentage of self-citations (%)	7.01	13.26
References written by Korean authors which are not self-citations		
Total	104	221
Mean	1.49	2.01
SD	2.32	2.46
Percentage of references written by Korean authors which are not self-citations (%)	2.68	6.48

Summary results of the analysis of the references included in the papers written by at least one Korean author working in a Korean institution, which were published in JACS and in BKCS in 2015. In the case of BKCS, only regular articles published in February, April, June, August and October were analyzed. JACS, *Journal of the American Chemical Society*; BKCS, *Bulletin of the Korean Chemical Society*; SD, standard deviation.

papers is 1.9 times larger than that for the JACS papers. One of the possible reasons for this may be that the reviewers of BKCS, who are mostly Koreans, either are more generous to authors' making an excessive number of self-citations or pay less attention to the appropriateness of references than those of JACS. We also point out that we have not observed any tendency of journal self-citation.

The average number of the references written by at least one Korean author in a Korean institution excluding self-citations is 1.49 for the JACS papers and 2.01 for the BKCS papers. The standard deviations, which are 2.32 and 2.46 respectively, are larger than the mean values. The percentage of these references among all references is 2.68% for the JACS papers and 6.48% for the BKCS papers. We notice that these rates are much smaller than those of self-citations. There is a strong tendency toward author self-citation and a tendency for Korean authors not to cite other Korean authors frequently. We also note an interesting feature that Korean authors cite other Korean authors substantially more often in a domestic journal than in an international journal of high reputation. The rate 6.48 is about 2.6 times larger than 2.68.

As we mentioned earlier, the process of reference selection is not entirely academic, but is also influenced by various social and psychological factors. It occurs often that authors make a guess about possible reviewers and include their publications as references to give a positive impression in case they are actually chosen as reviewers. This may give a partial explanation of why the rate of citation of other Korean authors in BKCS is much larger than that in JACS, because the reviewers of BKCS are mostly Koreans, while those of JACS are almost always foreigners.

We think, however, that there is another subtle reason for this phenomenon. When Korean authors publish their good results in a prestigious international journal, they may have a psychological desire to be recognized as representative Korean researchers in the field by the global academic community. This may lead to the consequence that they cite the works of other Korean researchers considerably less frequently than

usual. In fact, we believe this kind of tendency is universal and is not limited to Korean authors. It may appear more clearly in Korea because Korea is a small, closed society with well-defined cultural boundaries. On close inspection, however, we believe a similar tendency will be observed in all countries, though perhaps in a modified form. In a more general perspective, we think this is a pertinent example of social exchange theory, which claims that social behavior is the result of an exchange process, the purpose of which is to maximize benefits and minimize costs [2,3]. The benefit of making more self-citations and citing other Koreans less is to give a positive impression that the author is a representative expert in the field in Korea, while their cost is to give a negative impression that the author is arrogant and dishonest. This cost and benefit effect is different when a paper is published in a top international journal or in a mediocre domestic journal, which leads to different behaviors. Socio-psychological aspects associated with reference selection are an area which has not been explored in detail and deserves to be studied further.

We have also performed an independent samples t-test to examine differences between the two data sets, using IBM SPSS ver. 22. In Table 2, we show the results of the analysis of three variables, which are, respectively, the percentage of all references written by at least one Korean author in a Korean institution in each individual paper, the percentage of self-citations in each individual paper and the percentage of the references written by at least one Korean author in a Korean institution, which are not self-citations, in each individual paper. The mean values of the second variable, 7.07 and 11.86, are slightly different from the corresponding values in Table 1, 7.01 and 13.26. This is because the former are the averages of the percentage of self-citations in each individual paper, while the latter are obtained by dividing the total number of self-citations in all papers by the total number of references in all papers. The same applies to the other data in Table 2. The values of P were calculated from the obtained t-values and the corresponding degree of freedom, 178. We find that the test

Table 2. Results of an independent samples t-test for JACS (n=70) and BKCS (n=110) papers

Variables	JACS (n=70)		BKCS (n=110)		t-value
	Mean	SD	Mean	SD	
Percentage of all references written by Korean authors (%)	10.06	8.34	18.4	13.31	14.52***
Percentage of self-citations (%)	7.07	6.66	11.86	11.97	16.83**
Percentage of other Korean citations (%)	2.99	4.28	6.54	7.27	21.04***

The three variables used are the percentage of all references written by at least one Korean author in a Korean institution in each individual paper, the percentage of self-citations in each individual paper and the percentage of the references written by at least one Korean author in a Korean institution, which are not self-citations, in each individual paper. The results indicate that there are statistically significant differences between the two groups.

JACS, *Journal of the American Chemical Society*; BKCS, *Bulletin of the Korean Chemical Society*; SD, standard deviation.

***P < 0.001, ** P < 0.01.

was statistically significant in all cases and both the percentage of self-citations in each paper and that of the references by other Korean authors in each paper are significantly larger in BKCS than in JACS.

In conclusion, we have investigated the citation patterns of Korean scientists by analyzing the references of the papers authored by Korean chemists and published in two journals of different standing, JACS and BKCS, in 2015. We have found that the self-citation rate is much larger than the citation rate of other Korean authors in both journals. We have also found that the percentage of self-citations and the percentage of the references by Korean authors excluding self-citations are both significantly larger in BKCS than in JACS. We have made some discussions on socio-psychological aspects involved in the reference selection process. There are many questions in this subject which have not been explored. A further study in

other academic disciplines will be greatly helpful.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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Current status of Science Citation Index Expanded listing of Korean medical journals and effect of PubMed electronic publication ahead of print to their impact factors

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Abstract

This year marked the twentieth anniversary of the Korean Association of Medical Journal Editors (KAMJE). The number of member journals has increased from 105 to 257 since its inception in 1996. In the same period, the number of journals listed in the Science Citation Index Expanded (SCIE) has increased from zero to 35. The average journal impact factor (JIF) that was initially 0.13 has now increased by more than tenfold on average to 1.45 as of 2014. Many KAMJE journals that are not indexed in the SCIE are putting their best effort towards eventual inclusion. Following listing with SCIE, however, editors have turned their attention towards the JIF and have shown interest in early online publication as a means of improving the JIF. The current status of PubMed electronic publication ahead of print (EAP) was surveyed among KAMJE journals that are indexed in the SCIE, and the impact of this EAP on the improvement of the JIF was investigated. Based on the survey, more than half of the members have started or are planning on implementing EAP. However, these efforts were found to be still in their infancy, and they have been insufficient to serve as a basis for scientific analysis. Since the sample size is too small and the implementation period too short to statistically analyze the effects of early publication on the JIF, a case-by-case approach was taken. Based on case studies, it is difficult to draw conclusions yet about whether online early publication enhances the JIF.

Keywords

Journal impact factor; Korea; Medical writing; PubMed; Publishing

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Introduction

The Korean Association of Medical Journal Editors (KAMJE), at the time of its founding in 1996, had 105 member journals, including specialist academic journals and those published by medical schools and scholarly associations. Among the members, only five were listed in Medline, and none were included in the Thompson Reuters Science Citation Index (SCI). As such, as part of its operations, KAMJE has made a significant effort toward enabling journal listing on the Science Citation Index Expanded (SCIE) and Medline by improving the quality of Korean medical journals.

February 2016 marked the twentieth anniversary of KAMJE's establishment. The number of member journals has grown to 257, and the areas of expertise have also expanded to cover not only medical, dental, and nursing, but also veterinary, nutrition, and life sciences. Meanwhile, the number of journals registered with Medline has increased to 23. There are also 93 journals in PubMed Central (PMC), 79 in Scopus, 10 in the Emerging Sources Citation Index, and 35 in SCIE. It can fairly be said that the association has clearly reached achievements that fall in line with the objective of its establishment.

This paper takes a close look at the changes over the past 20 years with regard to the SCIE listing, which is the subject of significant attention from editors among various academic journal databases, and to the journal impact factor (JIF). Moreover, it has been observed that academic journals that have successfully been added to the SCIE have been implementing or planning to execute online early publication ahead of the printed version in order to improve their JIFs. This paper also examines the current state of this trend.

Methods

Bibliographic information of all 257 KAMJE journals were analyzed to find the listing in SCIE. Also, citation index of 35 journals listed in SCIE was calculated to trace its changes from 2014 Journal Citation Ranking and Web of Science. In order to study the current trend of Korean journals' adoption of early online publication, we conducted email survey with 35 SCIE-listed KAMJE journals, 29 of which provided responses. Since the sample size is too small and the implementation period too short to statistically analyze the effects of online early publication on the SCI JIF, we decided to take a case-by-case approach for the *Korean Journal of Radiology* (KJR), *Yonsei Medical Journal* (YMJ), *Journal of Korean Neurosurgeon* (JKNS), and the *Journal of Korean Medical Science* (JKMS). Results were presented as descriptive statistics. No ethical approval was necessary because there is no personal information.

Results

KAMJE member journals' SCIE listing and changes in the citation index

The addition of KAMJE member journals to the SCIE began with *Experimental and Molecular Medicine* (EMM) in 1996. The YMJ and JKMS followed in 1998 and 1999, respectively. The number of KAMJE journals listed in SCIE was merely five by 2006 (Fig. 1). However, 11 journals were added in 2008, followed by another seven in 2009. By the year before last, a total of 30 KAMJE journals had been included in the journal citation reports [1]. Now there are 35 KAMJE member journals in the SCIE. Meanwhile, the only significant difference between SCIE and SCI is that the former is published online only, whereas, for the latter, only certain excerpts are published in CD/DVD forms due to storage issues; there are no other notable differences. Among KAMJE member journals, three (EMM, YMJ, and JKMS) are part of the SCI.

Looking at the changes in the SCI JIF of the member journals, EMM's initial JIF was only 0.13. That had increased by 2005, when the average of the four journals at the time reached 1.21. While the JIF fell in 2009 to 0.6, it has since then been steadily increasing, with the average of the 31 journals in 2014 reaching 1.45, a more-than-tenfold increase from the beginning (Fig. 1). The sharp drop in the average JIF in 2009 and 2010 is attributed to the fact that a total of 18 journals were added in 2008 and 2009 alone. At the time, Thompson Reuters added journals *en masse* per the regional selection

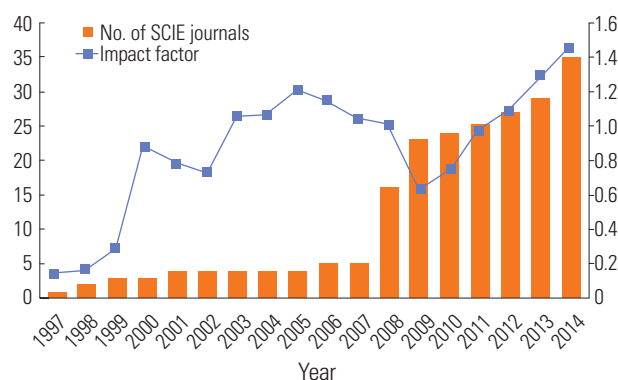


Fig. 1. Trends in the number of member journals listed in the Science Citation Index Expanded (SCIE) among the members of the Korean Association of Medical Journal Editors (KAMJE) and their average journal impact factor (JIF). The number of KAMJE journals listed in SCIE was five by 2006. Eleven journals were added in 2008, followed by another seven in 2009. Six more were added by 2013, and another six in the year 2014. In total, 35 KAMJE member journals are currently indexed in the SCIE. The JIF has been steadily increasing with the average of the 31 journals in 2014 reaching 1.45. The sharp drop in the average JIF in 2009 and 2010 is attributed to the fact that 18 journals were listed at once, and those journals had a relatively low JIF.

policy, and those journals had relatively low JIFs. But looking at the journals before and after 2007, it can be observed that the JIF average in general has gradually risen, with steep advances by those that were added after 2007 (Fig. 2). It is thought that the more recent academic journals might only be listed after highly rigorous preparations for being added to the index.

Considering the annual JIF highs, EMM, the first Korean medical journal to be added, looks to be leading and exhibiting an uptrend that is steeper than average (Fig. 3). In 2014, there were 31 journals that could be included in the JIF calculations. Among the 35 SCIE journals, three were excluded, as they had only been added just recently, and the *Korean Journal of Medical History* is not subject to calculation since it is part of the Arts & Humanities Citation Index. The distribution of the 31 journals shows that the JIF of about half, 15 journals, fall in line between 1 and 1.5, bringing the average to 1.452 (Fig. 4). Ten journals each have JIFs higher than 1.5,

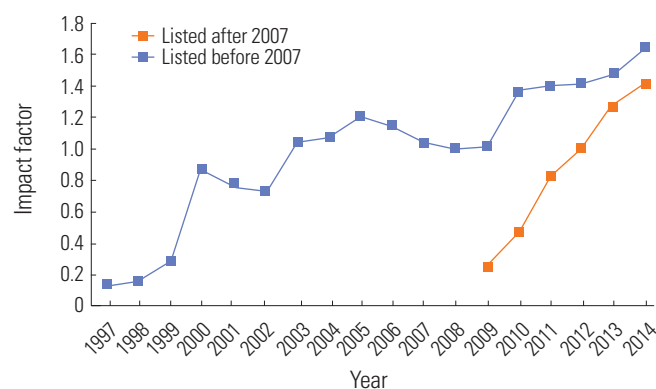


Fig. 2. Changes in the average journal impact factor of Korean Association of Medical Journal Editors journals listed in Science Citation Index Expanded before and after 2007. The average journal impact factor in general has gradually risen, with steep advances in journals that were added after 2007.

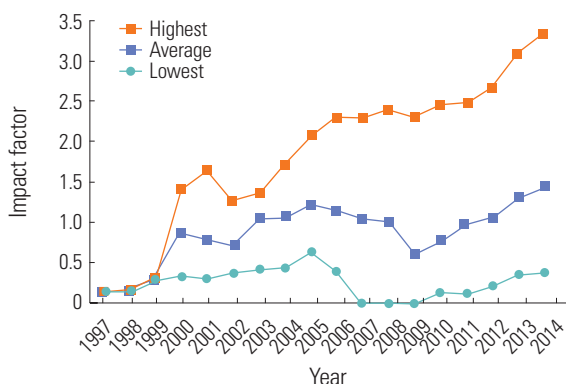


Fig. 3. Change in the highest, lowest, and average journal impact factor of Korean Association of Medical Journal Editors Science Citation Index journals.

with three of them between 2.0 and 3.0 (*Journal of Gynecologic Oncology*; *Allergy, Asthma & Immunology Research*; *Journal of Neurogastroenterology and Motility*) and just two above 3.0, which are EMM and *Cancer Research and Treatment*.

Among the 27 journals that were included in the JIF computation in 2013, only five saw decreases by a slight amount in 2014 and the rest of them saw increases. Among the journals that saw their JIFs rise by more than 0.5, EMM showed the greatest increase, going from 2.462 to 3.446. Other examples of rapid advances include the JIF of the *Journal of Gynecological Oncology*, which moved from 1.6 to 2.494; *Biomolecules & Therapeutics* from 0.841 to 1.727; the *Korean Journal of Orthodontics* from 0.37 to 1.173; and *Asian Nursing Research* from 0.418 to 1.0.

Impact of early online view on improvement of impact factor

Twelve journals had implemented online publication on their own websites, and five said they were in planning stages, meaning more than half of the participating journals have shown interest in early publication in some form. Also, there were eight journals that have already implemented the PubMed

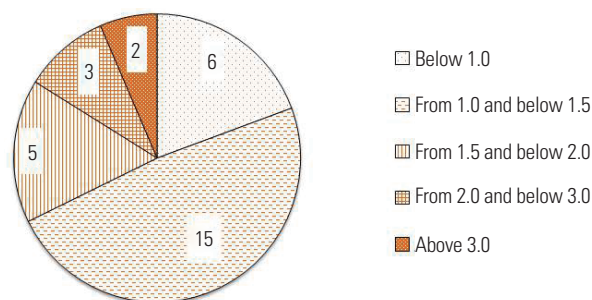


Fig. 4. Distribution of the journal impact factors of Korean Association of Medical Journal Editors Science Citation Index Expanded journals in 2014. About half, 15 journals, fall between 1 and 1.5, bringing the average to 1.452. Ten journals have journal impact factors higher than 1.5, with three of them between 2.0 and 3.0, and with just two above 3.0.

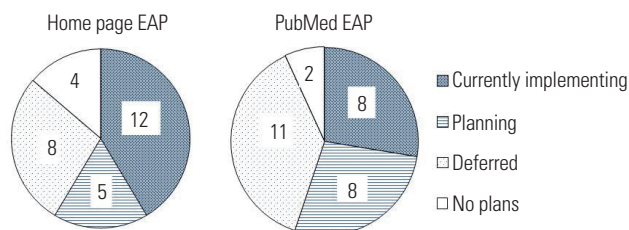


Fig. 5. Early publication status of 29 Science Citation Index Expanded journals. Among 29 Science Citation Index Expanded journals, 12 implemented online publication on their own websites, and five are in planning stages. Eight journals implemented the PubMed electronic publication ahead of print (EAP), and another eight plan to adopt it.

electronic publication ahead of print (EAP). Another eight showed interest, which indicates this topic is also of interest to more than half of the sample journals. But with regard to the timing of implementation, one journal began online publishing in 2003, one in 2009, and two in 2010, with the remaining eight having started the effort only since 2012. For PubMed EAP, all but one started since 2013, with the earlier one starting in 2007. It is clear that the journals are in their early stages of implementing these efforts (Fig. 5).

Case-by-case approach showed some implications. The KJR, which was indexed in the SCIE in 2001, began publishing on its own website in 2009. KJR had a JIF of 1.78 in 2001, right after it was listed on the SCIE. That deteriorated over time, hitting a low of 1.05 in 2008 and rising back to 1.5 after 2009. It is not clear whether early publication has had a significant impact on the improvement of the JIF (Fig. 6). It is estimated that the decrease in KJR's JIF after listing with the SCIE was due in part to the rapid increase in the number of dissertation compilations, nearly doubling over the year. On the other hand, YMJ was listed in the SCIE in 1998 and began early publication on its website in 2010. YMJ is uploading the entire full-text papers to PMC one month before its print versions are published instead of publishing them via PubMed EAP. YMJ's citation index has steadily been growing since its SCI listing, but the pace of the increase is not much different

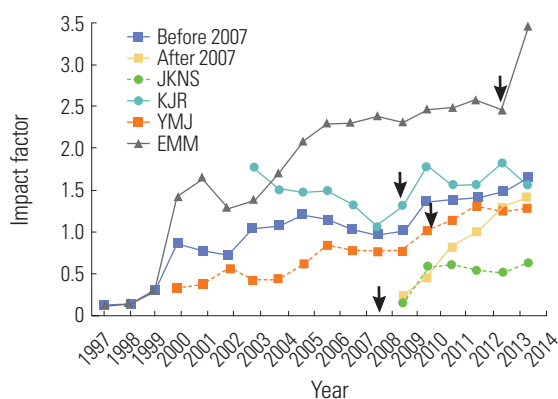


Fig. 6. Relationship between early publication and journal impact factor, based on case studies. The black arrow indicates the beginning year of PubMed electronic publication ahead of print of the Journal of the Korean Neurosurgical Society (JKNS). The white arrows indicate the years that the Korean Journal of Radiology (KJR) and Yonsei Medical Journal (YMJ) implemented early publication through their own websites. Both YMJ and Journal of Korean Medical Science are included in the General & Internal Medicine subject category of the journal citation reports, and showed a very similar trend of the journal impact factor. The arrow with the diagonal lines points to the year that *Experimental and Molecular Medicine* (EMM) started publication only on the Internet. The pace of the increase of impact factor in these journals is not much different from that of the average of all Korean Association of Medical Journal Editors journals overall.

from that of the average of academic journals overall, so it was difficult to draw a conclusion about the effects of early publication. JKMS recently started online early publication through its website, so it is difficult to determine its impact on the improvement of the JIF. Both YMJ and JKMS are included in the General & Internal Medicine subject category of the journal citation reports, and showed a very similar trend in their JIF (Fig. 6).

JKNS, which has the longest history among all member journals of implementing PubMed EAP, began in 2007 and was listed on SCIE in 2008. JKNS's JIF rose sharply by the following year from 0.155 to 0.607, but there has not been much of a change since then. Rather, it has even been found to be lagging in the pace of JIF growth compared with other academic journals that got listed after 2008.

EMM, a leading domestic medical journal with regard to the JIF, has been publishing only online since January of 2013, without adopting PubMed EAP. EMM's JIF has been increasing steadily since the journal's listing and rose rapidly in 2014, just a year after it changed its publication model to online only. This impact is not entirely fit to be called the impact of early publication because the online publication date becomes the same as the date of publication of the paper. The sharp increase in JIF in 2014 can be explained by the fact that in 2010 the number of published papers surpassed 80, while the number fell to about 60 after 2013, leading to what could be a relative rally in the JIF. Additionally, EMM; the *Journal of Gynecologic Oncology; Biomolecules & Therapeutics*; the *Korean Journal of Orthodontics*; an *Asian Nursing Research*, which experienced significantly rapid advances in 2014, have not adopted early publication, including PubMed EAP.

Discussion

Inclusion of 35 Korean medical journals to SCIE is a dramatic improvement of scholarly journal history in Korea. It was possible owing to the editors' devotion and sacrifice to their journals and the financial and manpower support by the publishers, most of which are academic medical societies. To exchange the information and to know current international trends, the KAMJE was established. Furthermore, KAMJE's effort to train editors and the maintenance of database such as KoreaMed, KoMCI, and KoreaMed Synapse was essential and important for journal's promotion to international level. Increase of impact factor of Korean medical journals are believed to be originated from their inclusion in PMC/PubMed because PubMed increased the visibility of them [2]. Inclusion to PubMed Central was possible by making PMC XML (journal article tag suite XML).

Above results on the effect of PubMed EAP showed still no

conclusive data due to small sample size. Many domestic academic journal editors are just as interested in the improvement of JIFs as they are in becoming part of SCIE. Although many have warned of the limitations of JIFs [3], the JIF of publications of a researcher decides almost everything in recruitment, funding, renewal, promotion, and tenure in Korea. Evaluation indicators of scholarly journals must be diversified [4]. A basic and important measure for improving JIFs would be to write high-quality articles and publish them as early as possible, however, one cannot ignore the factors external to the journal itself, such as the number of academics specializing in the subject field or the domain of knowledge. Most of the domestic academic journals still have relatively low JIFs, and as such, it might be helpful in boosting the JIF if renowned international scholars were invited to provide some review articles on popular topics.

The *Korean Journal of Internal Medicine* (KJIM) where the author (Kim BH) of this paper worked as an editor from 2007 to 2013, invited international scholars to write reviews in order to improve the chances of its entry into SCIE. KJIM, even before being added to the list, has been manually analyzing the number of citations on Web of Science. The number had been around and below 0.4 up to 2009, but thanks to the editorial board's efforts, that has begun to rise, reaching 1.3 by 2012. According to the citation analysis, the original paper was cited 1.5 times on average per article a year, and the case report reached 0.7. On the other hand, the review reached 5.5, clearly showing the benefits of an invitation. KJIM's official JIF in 2014, after being listed in SCIE, was 1.426.

Recently, many editors have been trying early online publication with hopes of improving their JIFs. This is because the recent two-year span of citation frequency is necessary to calculate JIFs, and it might be in the editors' interest to increase the exposure time by utilizing early online publication [5]. Although one study has indicated that early exposure has a positive impact on the JIF [5], another report has a more negative take on the hypothesis and concludes that comparative research to determine the effects of early exposure is essentially impossible and that it would at least not decrease the JIF of a subject journal [6]. Even if one were to determine positively that early exposure would contribute to the improvement of JIFs, if many influential academic journals participate in early publication or if they expose their papers as fast as possible via online platforms, then any positive impact that might have been present is bound to be diluted.

Early publication is a way for journals to take care of accumulated papers first, and it also means a potential right of preemption. These days, a number of prominent journals are only doing online publication, and this means the date of the paper's uploading is the date of publication, not entirely in

line with the concept of early publication. In Korea, EMM started publishing online only in 2013, uploading approved papers on a weekly basis and reducing the time span of publication.

Methods of early publication include publishing materials on the journals' own websites before the printed versions become available (forthcoming issues or online early publication), as well as publishing them on the more influential PubMed. PubMed EAP is a way for a publisher to request to upload its abstract to PubMed first. The full text is often unavailable for a PubMed EAP, usually because the commercial publisher would provide that as a service or for a fee. If there is open access, one might be able to find the full text through the journal's website, but information such as the DOI, publication date, volume and number, and page numbers might not be available.

In conclusion, the citation metrics of KAMJE member journals indicate their growth in international influence owing to concerted efforts between KAMJE and its member journals. At the time of its founding in 1996, none were listed in the SCIE, but 35 member journals are currently included in this database. More than half of these journals have interest in online early publication as a means to improve their JIFs, but it is still in its infancy and insufficient to statistically analyze its impact on the improvement of JIF. Based on case studies of KAMJE member journals, it is difficult to conclude that early publication helps with the enhancement of the SCI JIF. A longer-term approach with a larger number of journals as study subjects is warranted for more relevant research.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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Status of digital standards in Korean medical journals in 2016

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Abstract

This study aimed to characterize the current status of a variety of digital standards in medical journals published in Korea in 2016. A total of 256 journals listed as member journals of the Korean Association of Medical Journal Editors were searched to evaluate the following items: an independent journal homepage domain; an e-submission system; the use of digital object identifiers (DOIs), CrossMark, and FundRef; the availability of text and data mining; the presence of Open Researcher and Contributor ID (ORCID) information, an open access declaration, and the language of the journal. The search was carried out from July 29 to 30, 2016. Independent journal homepage domains were found for 190 of the 256 journals (74.1%). Of the journals, 216 were equipped with an e-submission system (84.4%), and 218 journals used DOIs (85.2%). CrossMark and FundRef were used in 105 journals (41.0%), text and data mining were available for 31 journals (11.1%), ORCID identifiers were present in 24 journals (9.4%), and an open access declaration according to a Creative Commons license was present for 199 journals (77.8%). The number of English-language journals was 130 (50.8%). Open access journals and English-language journals were found to have implemented more digital standards than non-open access journals and Korean-language journals respectively. The above results demonstrate that digital standards have been rapidly implemented by a considerable number of medical journals in Korea. In order to facilitate the more active promotion of journals to the international level, more journals should utilize these standards. The use of full-text JATS (journal article tag suite) XML is recommended for the easy adoption of DOIs, CrossMark, FundRef, and ORCID.

Keywords

Access to information; Digital standards; Korea; Medical writing; Open access

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Introduction

Digital standards for scholarly journals include an independent journal homepage domain, the implementation of an e-submission system, and the use of Crossref, digital object identifiers

(DOIs), CrossMark, FundRef, Crossref text and data mining (TDM), and Open Researcher and Contributor ID (ORCID). The last four items have been discussed in previous training program [1], and the first two items are discussed in this study. Crossref DOIs are digital identifiers of scholarly journal articles and books managed by Crossref, one of registration agencies of the DOI Foundation. CrossMark is a service of Crossref that provides the most recent versions of documents, and FundRef is a unique ID for funding agencies [2]. Crossref TDM is a service providing data access through the Crossref TDM application programming interface (API). This API is designed to allow researchers to easily harvest full-text documents from all participating publishers regardless of their business model [3]. ORCID is a unique ID for researchers that can display their biography, education, funding, and publications [4]. An open access declaration was considered present if a journal declared that a Creative Commons license applied to their content, not merely if they provided free access.

This study aimed to characterize the current status of the adoption of these standards in Korean medical journals. Additionally, comparative analyses were performed of the adoption of digital standards between journals with an open access declaration and those without such a declaration and according to journal language. We also would like to suggest to journal editors or publishers ways of efficiently implementing these standards.

Methods

From July 29 to 30, 2016, the homepages of 256 medical journals listed by the Korean Association of Medical Journal Editors (KAMJE) were visited. A discrepancy was noted in the number of member journals between the KAMJE journals page (http://www.kamje.or.kr/intro.php?body=Journals_KAMJE) and the KAMJE publisher page (<http://www.kamje.or.kr/intro.php?body=member-pre>). Therefore, we included

all journals found on either page. The KAMJE journals include journals from the medical, dental, nursing, veterinary, nutritional, and life sciences fields. The status of the adoption of the abovementioned digital standards was assessed based on the journal homepage and current issues of the journal. An independent journal domain refers to a domain different from the publisher's homepage. Comparative analyses according to the presence of an open access declaration and language were performed using the chi-square test in DBSTAT ver. 5.0 (DBSTAT Co., Chuncheon, Korea; available from: <http://dbstat.com/>).

Results

Independent journal homepage domains were found for 190 of the 256 journals (74.1%). E-submission systems were present in 216 journals (84.4%). DOIs were provided by 218 journals (85.2%), CrossMark and FundRef were adopted by 105 journals (41.0%), the TDM service was available for 31 journals (12.1%), and ORCID information was available for 24 journals (9.4%). Of the 199 open access journals, 197 had DOIs, in comparison to 20 of the 57 non-open access journals ($P = 0.000$) (Fig. 1). CrossMark and FundRef were present in 105 out of the 218 journals with DOIs (48.2%), of which 31 (14.2%) provided TDM. Of the 24 journals providing ORCID information, 22 were open access journals. All 131 English-language journals used DOIs, in contrast to 88 of the 126 Korean-language journals ($P = 0.000$) (Fig. 2). Of the 256 journals, only 15 were not free-access: five journals required a paid subscription, six required membership registration, and four had no homepage. Therefore, of the 57 non-open access journals, 42 were free-access, and 241 of the 256 journals (94.2%) were free-access or open access with no embargo period. Of the journals, 245 were published in cooperation with publishing or information technology companies in Korea. The remaining 11 journals (8.6%) were published in cooperation with international publishing companies such as

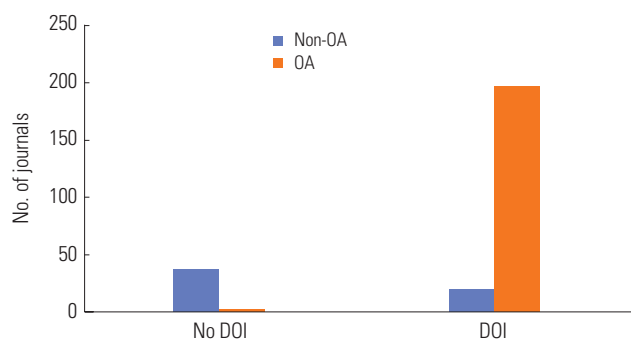


Fig. 1. Number of journals with digital object identifiers (DOIs) according to open access (OA) status, based on a sample of 256 Korean medical journals in July 2016.

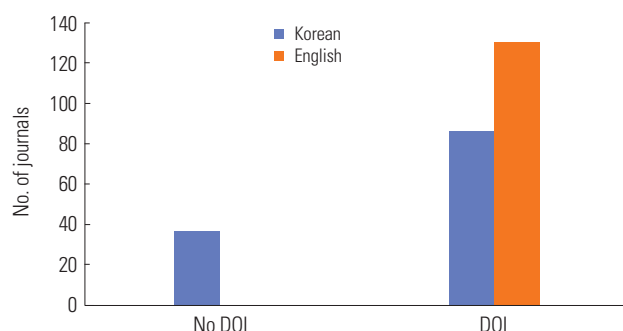


Fig. 2. Number of journals with digital object identifiers (DOIs) according to language, based on a sample of 256 Korean medical journals in July 2016.

Elsevier (4), Springer (4), BioMed Central (2), and Nature Publishing Group (1). All journals were published by scholarly societies or non-profit organizations in cooperation with the publishing companies.

Discussion

It was surprising to find that such a high proportion of the analyzed journals implemented at least some crucial digital standards, such as an independent journal homepage domain (74.1%) and DOIs (85.2%). The DOI system was first introduced to medical journals in Korea in September 2007, and the first adopter of DOIs was the *Journal of the Korean Ophthalmological Society*. Subsequently, the KAMJE has emphasized the adoption of the DOI system to its member journals. Additionally, the DOI system emerged as an evaluation item that is currently mandatory for Korean scientific, technical, and medical journals to receive support from the Korean Government [5]. CrossMark, FundRef, and TDM are very easy to adopt if a journal is registered with the Crossref DOI system. No technical difficulties are involved in introducing these three services. For scholarly journals to implement these digital standards, the publication cost should be invested to information technology work because, these standards additionally requires the participation of a web developer. The importance of the online version may be expected to steadily increase, and the adoption of digital technology by medical journals is an essential part of journal promotion [6]. The market for the online version of journals will likewise expand rapidly. Large commercial publishing companies or publishing organizations have expanded their reach online by developing online mega-journals such as *PLoS One*, *BMJ Open*, and *Scientific Reports* [7]. How can medical journals from Korea survive as local journals in the international journal market where large commercial publishing companies have dominated in: Top six commercial publishers dealt with 52.2% of Journal Article Ranking journals and top eight publisher published 50.7% of Web of Science articles [8]. If local journal publishers want their journals to only be circulated in their countries, it is not as necessary to invest in these digital standards. However, if they want their journals to attain international-level status, they should adopt these standards. Changing the language of journals from Korean to English has been a common phenomenon in Korean medical journals. After the *Journal of Korean Medical Science* was the first Korean journal to be included in PubMed Central (PMC) in December 2008, many publishers and editors have come to understand that converting the language of the journal to English and producing PMC XML (journal article tag suite [JATS] XML) are the best way for their journals to be propagated to

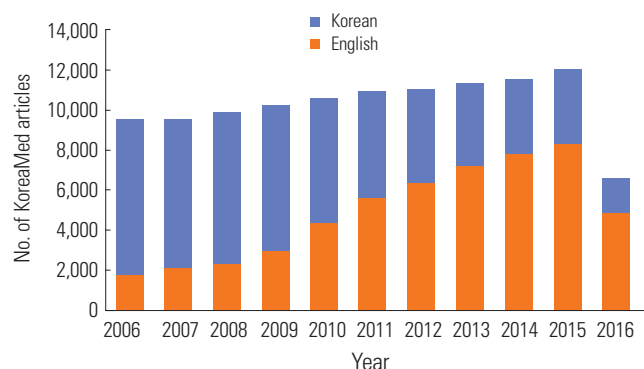


Fig. 3. Number of KoreaMed (<http://koreamed.org>) articles in English and Korean from 2006 to July 30, 2016.

researchers worldwide. The main reason some medical journals from Korea have been underestimated is the language barrier, so journals have been changed to English-only and registered in PMC. This has resulted in a rapid increase in the number of articles in English and a decrease of the number of articles in Korean from 2006 to 2016 (Fig. 3).

We make the following suggestions for the efficient adoption of the above standards:

First, an independent journal domain requires no more than 25 US dollars a year. After creating a new domain name, the journal content should be moved from the website of a society or institute to the independent journal domain.

Second, an e-submission system requires an adequate budget. If fewer than 40 manuscripts are submitted annually or the manuscripts are all from Korean researchers, it is not necessary to adopt an e-submission system, because the editorial staff can manage the submissions without difficulty. If editors want their journals be promoted to the level of international journals that receive manuscripts from all over the world, or if a journal receives more than 40 submissions annually, an e-submission system is a convenient way to manage the journal. Again, the publisher must invest funds in such a system.

Third, DOIs, CrossMark, FundRef, and Crossref TDM are all services provided by Crossref. The most straightforward way to adopt these four systems efficiently is the production of JATS XML and registration with the Crossref service [9]. At present, the cost per article for JATS XML production is usually from 30 to 50 US dollars. If the publisher cannot provide these funds, an additional article processing charge for authors may be incorporated. If JATS XML files are produced, they can be deposited to free full-text databases based on JATS XML, such as PMC (<http://www.pubmedcentral.org/>) or ScienceCentral (<http://e-sciencecentral.org/>). PMC accepts only English-language journals; whereas ScienceCentral is a repository for journals in all languages. In Korea, no additional cost is usually required for the adoption of CrossMark,

FundRef, and Crossref TDM, if journals have already adopted the DOI system and produce JATS XML. This is possible due to the excellent state of information technology and engineering in Korea.

Fourth, no extra cost is required for ORCID adoption once JATS XML is produced. If ORCID becomes a mandatory part of all authors' information, it is not difficult to adopt this author identifier system.

Fifth, it is time for the 41 free-access journals to declare an open access policy according to a Creative Commons license. If free-access journals adopt a Creative Commons license, they can immediately be converted into open access journals, at which point it is recommended that they be registered in the Directory of Open Access Journals (DOAJ, <http://doaj.org/>). Some major international reference indexing databases, such as the Web of Science Core Collection, have a policy of recognizing a journal as open access if it is registered in the DOAJ. No medical journal in Korea focuses on the pursuit of commercial profit. All publishers or editors want their content to be widely read and used by researchers, physicians and health professionals, medical students, and patients and their families from all over the world. No additional cost is required to convert a free-access journal to an open access journal. The only difference between an open access journal and a free-access journal is whether it allows secondary use for educational, research, and/or commercial uses. To facilitate the easy and timely use of the journal content, an open access policy and the deposition of full-text JATS XML in international databases is beneficial [10].

Sixth, English-language journal editors whose journals still have not been registered in PMC should file a request with PMC as soon as possible after publishing at least 25 citable articles, such as reviews, original articles, or case reports.

Finally, it should be mandatory for medical editors in Korea to attend the training programs provided by the Korean Council of Science Editors (<http://kcse.org>) and the Korean Association of Medical Journal Editors (<http://kamje.kr>). All editors in Korea work on a voluntary basis. Therefore, it is not a full-time job, but a part-time job, making it important for editors to study international trends and new technology and standards by participating in these training programs.

One limitation of this study is that all medical journals from Korea were not included, because not all journals are members of the KAMJE. It is estimated that at least 700 medical journals are present in Korea according to a reference analysis of the KoreaMed journals (<http://komci.org>); however, the most important and influential medical journals published by major medical societies are all members of the KAMJE.

In conclusion, the degree of adoption of digital standards in Korean medical journals is very high, comparable to inter-

national journals. The adoption of digital standards was more common in the 199 open access journals than in the 57 non-open access journals. The same phenomenon can be observed in the 130 English-language journals, of which 100% were equipped with DOIs. This is due to the devotion and self-sacrifice of the editors and society members of these journals. These standards should be adopted more actively by publishers after sufficient budgetary investments are made into their journals. The production of JATS XML of full-text articles is suggested as an efficient and quick way to adopt those digital standards. The above findings provide basic information regarding the adoption of digital standards by the journals included in this analysis. For Korean journals to become highly accessible and fully comparable to international journals, those standards should be widely adopted in the near future.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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Supplementary Material

Raw data of the search performed in this study, not including the names of the journals or publishing companies.

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Taiwan Government's scientific journal supporting policy

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Abstract

This report discloses the journal supporting policy in Taiwan. At the moment, the Ministry of Science and Technology (MOST) not only gives financial support to each academic research projects but also plays an important role to the quality of many scientific journals. The MOST has established a competitive evaluation system to assess the quality of scientific journals. According to the policy of MOST, each academic association could apply financial support for one scientific journal. Around 60 journals receive support from MOST every year.

Keywords

Financial support; Journal; Policy; Science document; Taiwan

Introduction

In the early day in Taiwan, the science journals published in Taiwan focused on several specific fields. These fields focus on agriculture and technology. The understanding in these fields contributes to the fast growth, at least partially, of Taiwan economical condition. At that time, the government paid much attention to the improvement of agricultural technology. The publication of scientific documents in an international journal had attracted little attention. Nevertheless, things have changed a lot in recent years. Now, many scientific documents are published from the Taiwan scholars. For example, there are 27,810 documents published in SCIE from Taiwan scholars on 2015, according to the data from Thomas Reuters [1].

In Fig. 1, the number of scientific documents from several major countries in the time frame from 2012 to 2016 is summarized. The average value for the number of citation to each paper is 10.48 for all scientific documents; the value for Taiwan is 9.06. It ranks Taiwan as 20th in terms of the number of citation to each paper. Since this value is slightly lower than the average value of the whole world, there is space for further improvement.

Fig. 2 summarizes the performance of Taiwan scholars in terms of 22 academic fields. The number of citation and the number of scientific documents from Taiwan scholars are collected [1]. The ratio of the citation for the papers from Taiwan scholars to that for all papers in certain

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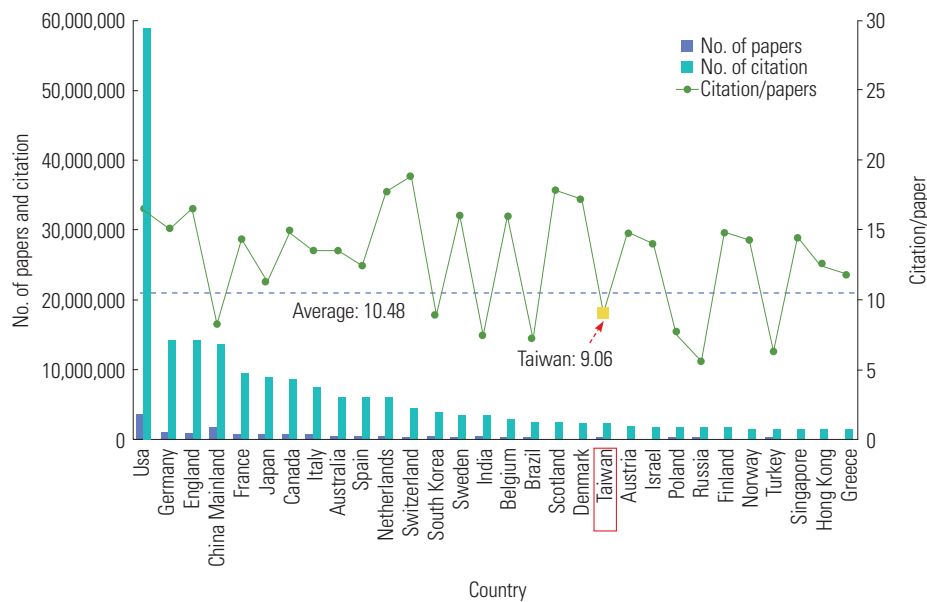


Fig. 1. The numeric distribution of scientific papers published from the authors of several major countries (from 2012 to 2016). The vertical-axis in the left-hand side stands for the number of science papers published and the total number of citation; the vertical-axis in the right-hand side presents the citation number for one scientific paper.

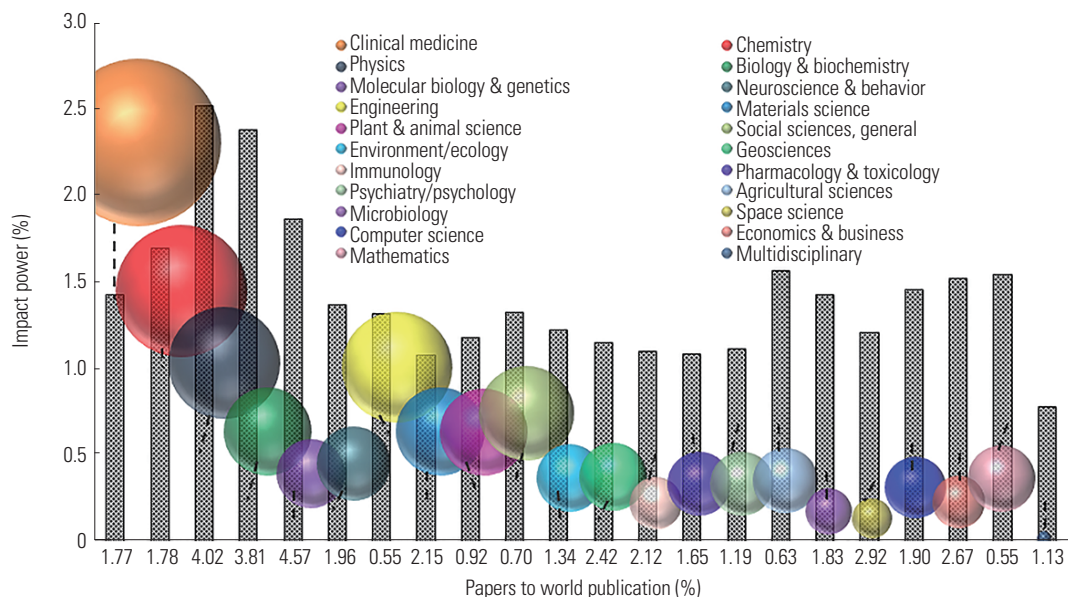


Fig. 2. Current status for scientific publications from Taiwan scholars. The impact power determined by the percentage of the citation for the papers published by Taiwan scholars to total citation, and the percentage of the number of published papers from Taiwan scholars to total number in terms of each academic field.

area is termed as impact power. The values for Taiwan scholars vary from 1% to 2.5%. The ratio of the number of the papers from Taiwan scholar to the total number is shown in the X-axis. This value varies from 1% to 5%. Three areas, physics, biology and biochemistry, molecular biology and genetics, the performance (in terms of impact power and number of publications) of Taiwan scholars is better than that of other areas.

These 3 areas have also received a relatively higher support from government.

It is also noted that though the number of publication from the engineering field is low; its impact power is high. It suggests that the quality, not only quantity, does play an important role on the academic achievements.

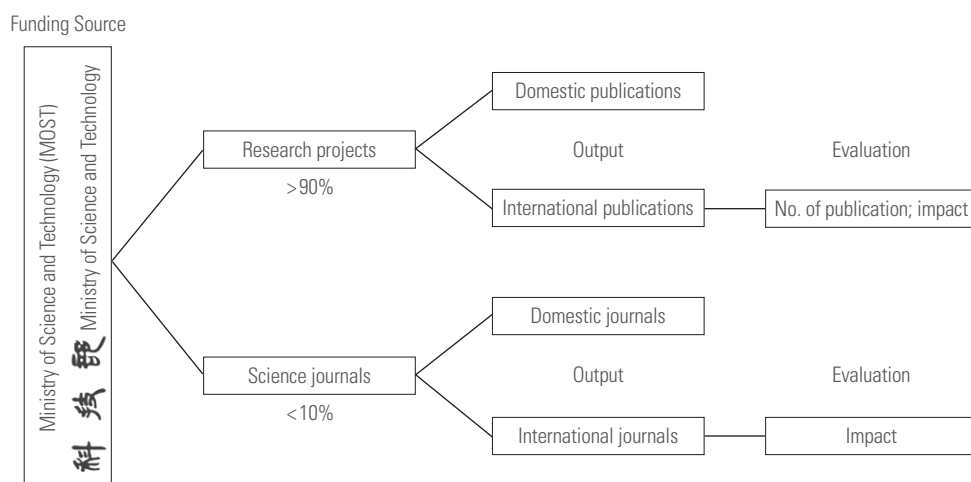


Fig. 3. Flow chart for the evaluation of scientific journals in Taiwan.

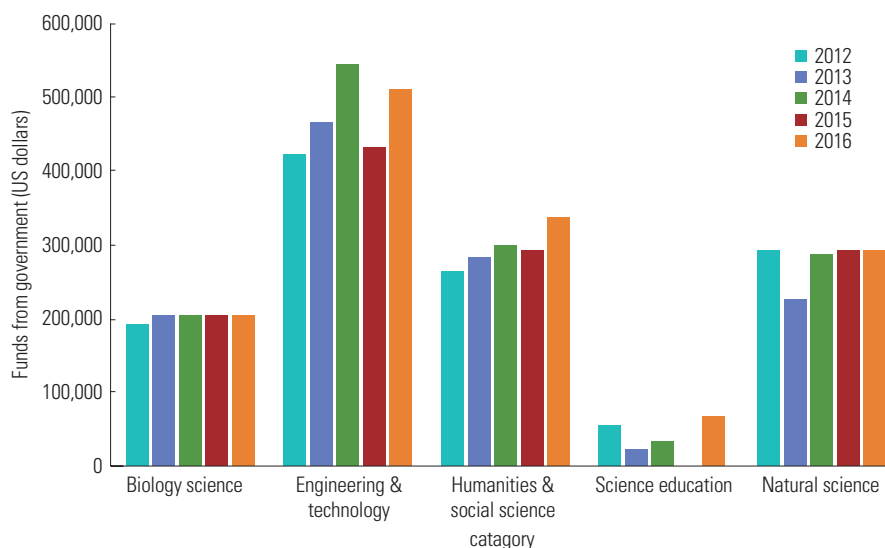


Fig. 4. Allocation of Taiwan government support to 5 academic categories from 2012 to 2016.

Support to the Scientific Journals

Apart from the support toward each research project, our government provides financial support to scientific journals on a very competitive basis. Fig. 3 shows the flow chart for the evaluation process [2,3]. The major funding source is the Ministry of Science and Technology (MOST). Most the funding (>90%) from MOST is used to support each research project. The performance of each research project is evaluated in terms of their output, the publications. Though some documents are published on local journals, most of them are published on international journals. The major reason is the publication in international journal received index, such as impact factor.

Part of the funding (<10%) from MOST is used to support scientific journal. There is a panel to review the application on a yearly basis. The application can be submitted through an academic association once a year. Each association should submit only one proposal. For example, the Materials Science Society in Taiwan submits one application each year to ask for the support for its journal, *Materials Chemistry and Physics*. The reviewers took the impact factor for each application seriously. As the impact factor is high, the support is almost guaranteed. For example, the impact factor for the *Materials Chemistry and Physics* is above 2. Its rank among other journals in the Materials Science field is around top 20%. The journal has received 100% support from the government.

Fig. 4 shows the financial support to the scientific journals

in the time frame from 2012 to 2016. Around 60 journals receive approximately 1.4 million US dollars from government. These journals can be divided into 5 areas. The biology journals receive around 200,000 US dollars each year. The support changes little in the last 5 years. The journals in the Engineering field receive a relatively higher support. The support to the journals from social science and natural science is also around 200,000 US dollars each year. The support to the education journal is relatively low.

Considering the number of journals published in Taiwan, the support from government is never enough. In fact, much support is provided by private sectors, such as academic associations. Although 60 journals have received support from government, the support from academic association, though small, is essential. There was the support structure for these 60 journals. There is 71% funding from government; the private sectors, such as academic associations and universities, make up 29%.

Conclusion

In general, the support from government is essential to the sustainability of scientific journal. However, the financial support from government is never enough due to limited budget. A way to achieve sustainability is an open; nevertheless, an important question. The contribution from private

sectors is gaining its weight in the last several years. Its contribution may play even bigger role in the years to come. Scientific journal is a platform for academic achievement. A healthy platform would benefit the academic community and the whole society in the long run.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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Using the Crossref Metadata API to explore publisher content

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Abstract

Crossref is a not-for-profit membership association for scholarly publishers, founded in 2000. It is the largest digital object identifier (DOI) registration agency and provides publisher members with the capacity to deposit DOIs and their associated metadata to support persistent linking between different types of academic content. In a previous paper in *Science Editing* [1], Crossref mentioned a newly-created interface (<http://search.crossref.org>) that allowed publishers, libraries and researchers to search across nearly 50 million Crossref metadata records for items such as journal articles, books and conference proceedings. Since that paper was published, the search service has graduated into a live production service covering over 81 million DOIs, and Crossref has documented and made available the application programming interface used to build and support the search interface. This paper will provide information on this Crossref Metadata API, which is being widely adopted and used by many different stakeholders in the scholarly community, and give examples of how it is being employed by these parties.

Keywords

Crossref; Crossref Metadata API; Digital object identifier

Introduction

When publishers register Crossref digital object identifiers (DOIs), they do so by depositing, at minimum the bibliographic metadata related to each article: journal/book title, ISSN (International Standard Serial Number), work title, author, publication date (print and online), URL (uniform resource locator) of the content and the DOI itself. By providing this information, the piece of content can be distinguished from other, similar pieces of content in other publications. This enables the article, book or conference proceedings to be linked to and cited distinctly by other researchers, and for publishers to be able to track how widely the work is being used.

Over time, the metadata that Crossref collects from publishers has expanded in scope as the workflows that publishers need to support has grown. Over and above the standard biblio-

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graphic information about a piece of content, publishers can also deposit ORCID iDs, funding and license information, full-text links (to enable indexing and text mining), updates to content and abstracts. With such a wealth of information being made available through the publisher metadata, it was becoming increasingly important that this information could be easily and widely disseminated. This way, anyone interested in using it could do so, and use it as a mechanism for finding information on publisher content, linking to it effectively and to build their own services on top of the information.

Before the current Crossref Metadata API was launched, it was possible to receive and interrogate the publisher metadata, but the process would have been as follows. To find out which licenses *Science Editing* uses via the Crossref metadata, an interested party would have to sign up to Crossref Enhanced Metadata Services [2], download around one terabyte of extensible markup language via the OAI-PMH protocol, and then parse and scan that information for *Science Editing* DOIs and the license information associated with those. Many third parties use this route, but many more needed information that would update dynamically as publishers deposited DOIs for new content and updated the information for existing content.

The Crossref Metadata API lets anyone search, filter, facet and sample Crossref metadata related to over 81 million content items with unique. It is free to use, the code is publically available and end-users can do whatever they want with the data. In exposing the authoritative cross-publisher metadata to the community in this way, it becomes more accessible, functional and much simpler to integrate with third party systems and services (from the publisher and the end-user side). This leads to smoother workflows and increased discoverability without changing existing publisher processes.

The history of the Crossref Metadata API

The Crossref Metadata API started life with the Crossref labs team in early 2013. The year before, Crossref had started a pilot in collaboration with publishers and funders to collect funding information in a consistent way in the publisher metadata so that it could then be used by funders to find and report on the outputs of the research they funded.

Crossref funding data [3] launched in May 2013, but to accompany the service there needed to be an efficient mechanism for funders to be able to get this data once it had been provided by publishers. It also needed to update dynamically as publishers added to or changed existing metadata, and funders needed to be able to filter and facet their searches to look for specific subsets of information to report on the KPIs

they were interested in. They also wanted reporting tools to be able to download, review and share this information as simply as possible.

Karl Ward, one of Crossref's Research & Development team worked on a revised, modern version of Crossref's existing application programming interfaces (APIs) to create a REST API that fulfilled the criteria that funders, research institutions and other third parties could use. Crossref also started to use it to build some of its own tools like a search interface for funding information (<http://search.crossref.org/funding>) where anyone could come and ask for a list of the content that had been funded by one of the parties in the Open Funder Registry—a taxonomy of over 12,000 standardized funder names.

With the launch of funding data, Crossref started to see the API being used extensively. Coupled with that, the increased breadth of the metadata that publishers could provide Crossref has also been growing - letting it be interrogated and used in lots of interesting ways.

Current use cases for the application programming interface at Crossref

The metadata API is used extensively within Crossref to power various tools and services. As noted, it provides the backbone for Crossref Metadata Search and the linked funding data search interface. Using the full-text links and license links provided by publishers, the API can be leveraged to provide cross-publisher support for text and data mining applications [4].

It can also power reports and reporting. There is top-level information accessible via the API on the metadata Crossref holds (e.g., how many journal DOIs does Crossref have), article level information, or interesting subsets of information e.g., how many publishers are depositing ORCID iDs (and which ones?) longer term, Crossref plans to build publisher participation reports from the API so that members can easily check the completeness of the metadata they are depositing with Crossref.

Use cases by third parties

Third parties can, and do use the API to integrate publisher metadata into their own products and services. Organisations leveraging the metadata to report on funder information and compliance with funder mandates were our first use case, but that has grown to include: (1) searching and placing references dynamically in scientific blog posts e.g., in Coko Foundation's Pubsweet 'science blogger' alpha [5] science blog platform; (2) helping authors find and verify their publications.

Kudos [6] use this to help their authors identify the works they have published; (3) built-in citation search in authoring tools/DOI reference matching like Authorea [7]; (4) helping build databases of specific content types e.g., open access journals; (5) assessing license information as described by Impactstory in their blog (<http://blog.impactstory.org/find-and-reward-open-access>); and (6) it also has the potential to be used in helping streamline open access workflows within academic institutions. Crossref is working with Jisc in the UK and other interested parties on <https://www.jisc.ac.uk/blog/new-publisher-led-initiatives-to-support-reporting-to-funders-21-mar-2016>.

Even at this relatively early stage, it is apparent that the API has a wide variety of uses, which will continue to grow over time. Crossref has also been working with developer communities on the service. Scott Chamberlain of rOpenSci has built a set of robust libraries for accessing the Crossref API [8], available in the R, Python and Ruby languages. There's also a javascript library [9] authored by <https://github.com/darobin> so users can interact with the API in the programming language they prefer to use.

Conclusion

The Crossref Metadata API currently sees around 32 million requests a month, up from 20 million just a few months ago. Crossref doesn't require users to register to use the API, so success is measured by the volume of usage seen, but also in the diversity of use-cases for the API. Crossref plans to provide an optional service level agreement version of the service in order to provide additional functionality and increased reliability to users dependent on it for their own products and services. Crossref will work with them to gather requirements, resource these and provide a service level agreement version of the API. And of course, as publishers deposit more, richer metadata with Crossref, the scope of what the API can do and support will continue to grow in turn, enhancing discovery, linking, citation and collaboration - all of the principles that

Crossref was set up to uphold when it was created.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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Scientific publishing in the Asian century: an international perspective

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Introduction

There was a time when Europe and North America essentially controlled the world of academic publishing, but today Asian countries are quickly emerging as leaders in the industry. As Chairman of Elsevier and past President of the International Publishers Association, I've had a unique opportunity to develop a global perspective on the trajectory of academic publishing both in Asia and throughout the world. Today, I'd like to share my perspective with you on the rise of Asian journals and what it takes to remain competitive in this increasingly global field.

When I think about the current world of scholarly publishing, I often think of a Confucian proverb, which in English translates to:

Be not afraid of growing slowly; just be afraid of standing still.

It's an old saying, but it encapsulates a lot of what I think about our industry today. In many ways, we are at an important turning point. New technologies are changing how we produce and consume content, and researchers are collaborating more across boundaries than ever before. But change doesn't happen overnight; well, at least good change doesn't. In our industry, even though there is a lot that is new, I think it's important not to lose sight of what hasn't changed. Content is still king. Top journals still need top quality content to stay competitive. The reputations of editors and titles still matter. And accessibility, whether we're talking about language, distribution, or content, still plays a big role in determining a journal's success.

To go back to the proverb, we should not be too afraid to grow slowly. That's the only sustainable way there is to grow. It's true that we have to try out new technologies, new processes, and new organizational structures as they come. But at the same time, we have to stay focused on executing the fundamentals well. We keep what works and toss out what doesn't. This process takes time, just like conducting good research takes time, but that's okay as long as we keep challenging ourselves to move forward. Positive change takes time; we just can't afford to stand still.

I know that everybody is interested in where Asia is headed in terms of scholarly publishing. I think it is actually still an open question, but there are some trends I've noticed, over the past few years that I'd like share with you.

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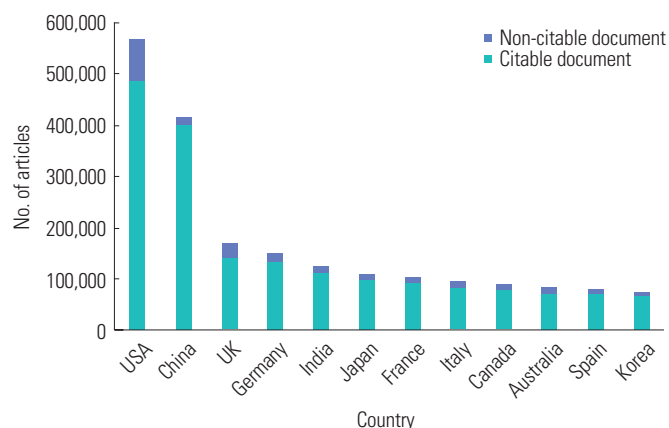


Fig. 1. Number of articles published in 2015 in Scopus according to country available from <http://scimagojr.com/countryrank.php?year=2015>.

Background for Promotion of Journals Based in Asia

It's common knowledge that Asia has made remarkable progress in terms of sharpening its focus on scientific research. Over the past two decades, research output in this region has grown by more than 9% per year—that is a truly exceptional growth rate. For comparison, over the same period of time there was 4.5% annual growth in Europe, and an even smaller 3.5% in the Americas. Today, five of the top twelve producers of research content are based here in Asia-Pacific (Fig. 1). On top of that, field-weighted citation impact has been steadily improving. This measure of impact normalizes at 1.0 for the world average across disciplines, and in the Asia-Pacific region we've seen it grow from 0.79 to 0.93 (Data from SciVal, available from: <https://www.scival.com>). It's not enough—we aren't 100% there yet—but things are really moving in the right direction. Another key indicator of research excellence is international collaboration. Twenty years ago, about 16% of the research output in Asia derived from international collaboration. Today we are at 23% and growing; in some Asian countries that number is closer to 50%.

Two Things Critical to the Future of Scholarly Publishing in Asia

People today understand that Asia has been growing quickly, and no one really doubts that the scholarly community on this continent has great potential. However, the fact remains that Europe and North America are still the main players in scholarly publishing. So there is still work to be done before Asian journals, Asian scholars, and Asian universities are really viewed as pre-eminent.

When it comes to the future of scholarly publishing in Asia, I see two themes as being really critical: The first is mastering the aspects of this industry that are staying the same—the ones that are not subject to change; the second is taking full advantage of new developments in academic publishing.

Fundamentals of Quality, Reputation, and Accessibility

There are a lot of serious challenges on the horizon for our industry. However, three aspects that are true today are not going to change much in the near future: first, setting high standards for published content; second, developing a strong reputation over time; and third, maintaining a high level of accessibility to readers in the scientific community. These three points will not change because they are the fundamental reasons why journal editors have jobs in the first place.

Quality

Now the first point is obvious, but it's worth mentioning—especially when it comes to Asia. For the past twenty years, we've been playing the 'quantity' game. There's nothing wrong with this. In fact, it's really important to put together a certain amount of mass—critical mass, as we say. However, I think that in the next twenty years, we need to change that word 'quantity' over to 'quality.' We have graduated from the 'quantity' game. Let's move on to the next goal, which is the 'quality' game. There has been steady improvement over the years, but today the citation impact of articles in Asia-based journals is still slightly under the world average. To get to the next stage, scholarly communities in Asia will need to become more aggressive about publication quality.

Now, I did not say that scholarly output from Asia is below the world average. It's just that in the end, a lot of Asia's best papers just go to Western publishers like Elsevier rather than to Asian publishers. That's the difference. And in the next twenty years, we have to work to bring those papers to Asian journals as well. One journal I know of that has done really good job with this is called *Particuology*, a journal which is published by Elsevier through a partnership with the Chinese Society of Particuology and the Institute of Process Engineering of the Chinese Academy of Science. The journal went from having a total of 8 citations in 2008 to 1,577 citations in 2015. And from 2009 to 2015, the impact factor moved from 0.9 to 2.3. *Particuology* rose very quickly by relying on the plain, old-fashioned principles of publishing. The key was focusing on journal metrics, critical decisions, discussions at the editorial level, marketing, and making sure everything was indexed the right way so that articles could easily be found. This just goes to show that focusing on quality really works.

Reputation

Another critical point is reputation. A journal is not just about conducting research or publishing papers; a journal is a community. That community is shaped by the reputation of the publisher along with reputations of the journal, the editor, and the author—this is obvious. But reputations don't just pop up overnight. They take a lot of time and effort to develop. Will a journal's one novelty, hot-shot article really change a reputation? No. Even if a piece of research is really strong, it can be hard for the article to break into the global mainstream research community if it comes out of a journal that has not developed a reputation for excellence. Just one article cannot determine a journal's reputation. There needs to be a steady flow of high-quality scholarly output for a long-term relationship to be built between the editors and the contributing authors. And over time, hard work pays off and you are able to build up your reputation.

My advice to editors in Asia is to focus on building up a brand that is synonymous with quality. The importance of reputation is not going to change anytime soon. If anything, with so many journals and so much scientific output, reputation is actually becoming more important than before. So I think that a lot of journals in Asia have an opportunity to become global leaders by building a reputation through consistent high quality.

Accessibility

The final point I want to highlight about what is not changing is the importance of accessibility. Reputation feeds into this, because when you develop a strong reputation, you naturally become more visible to a large group of people in the science community. On the other hand, when you do not have a strong brand that people recognize, it is hard to get your work out there to a large audience. However, there are plenty of other things that factor into accessibility beyond just reputation—distribution networks, web presentation, marketing, and pricing all matter. Each of these is a critical factor in accessibility, but one extremely important factor that I think we can't stress enough is accessibility of language.

Accessibility of Language

In order to compete at the top level in this global industry, you have to be able to communicate with the whole scientific community. That means communicating with people anywhere in the world. Today, as it has been for the past 35 years, the lingua franca is English. And whether you like it or not, no matter how high the quality of your content is, if it is not discoverable in English, then you're going to miss out on an opportunity to be recognized.

There are basically three types of journals when it comes to language and accessibility. The first type of journal is a local language journal that is tailored for local authors and audiences; the second is a local language journal with an English abstract; and the third is a full-text English journal.

Any journal without even an English abstract has to accept the fact that its audience is only going to be local. I know people say that online translation software is getting to the point where it is decently functional. But I still don't know of any translation software that's even halfway there. When we start seeing translation software with serious accuracy, there will no longer be a need for English abstracts in local-language publications. However, this is not happening anytime soon. Even with all the recent technological developments in machine learning and artificial intelligence, it will take a while for automatic translation to reach a level of accuracy where the final product is not confusing or misrepresentative. Why does it make such a big difference for articles to have English abstracts? An English abstract gives your article the chance to be indexed by Scopus and other indexing services. If readers find the abstract to be interesting, they will use translation software to try to read the full text; but, without an abstract, no one will even know that the article exists. This is a real challenge.

In a world that is so interconnected, journals in Asia with full English text articles will compete on an equal basis with journals in the West. In the long run, high-quality Asian journals with full English text will start to become household names in North America and Western Europe. It should not be long before Asian journals in English will compete with *Cell*, *Lancet*, *Nature*, and *Science*.

Maintaining a Global Focus

There are a lot of important things that are not changing. But there are a couple of things in our industry that are changing rather abruptly. Two of the major changes that I believe Asian journals have to pay attention to are having a global focus and embracing technologies that affect publishing. As I alluded to earlier, it used to be true that many Western journals enjoyed strong international reputations purely based on their geography. However, the days in which British or American journals get a free pass based on location are over. The world is shrinking every day, and other regions, particularly Asia-Pacific, have proven that they can compete on a high level. We are living in a world with far fewer boundaries than there used to be.

One really positive consequence of this for the scientific community is that it has become quite easy to collaborate with colleagues in different time zones all over the world. It

also means that scholars have more opportunities than ever to approach questions in an interdisciplinary manner. This increasingly global perspective in the scholarly community, along with a very strong focus on science research in Asia, opens up a lot of new possibilities. Going forward, old assumptions on both sides of the Pacific will continue to fade away. Researchers across the globe will continue to take Asian journals more seriously and will be more discerning in their assessment of Western journals.

I would encourage every editor in Asia to be aware of this trend and maintain an international focus. The world is watching journals based in Asia to see whether they are truly focusing globally, or if they are fencing themselves in to just an Asian audience and Asian authors. Reviewers and authors should come from anywhere in the world, not from just one country or just from Asia. But as an editor, you can't just wait for them to come to you; you have to go out and get them! It is essential to actively seek authors, editorial board members, and reviewers from beyond the confines of your own fence.

Adoption of new information technologies

Today no journal can really afford to not be serious about technology. One good reason is simply cost. If we do not use technology, journal publishing will be too expensive. But there is an even better reason to focus on technology: the possibility for innovative solutions to better serve the scholarly community. There are so many opportunities to utilize social media, data analytics, and mobile devices that will allow Asian editors to reach out to people more effectively than ever before.

For example, the *Journal of Orthopaedic Translation* now uses WeChat to give the journal more exposure in China. Additionally, some journals are starting to roll out initiatives like online HTML proofing tools for authors. At Elsevier, we're also starting to use something called 'audio-slides' on ScienceDirect's online platform. Audio-slides allow authors of the article to explain their work in their own words in a short, webcast-style video. These are just a few examples of how journals can leverage technology. We have not even started to crack the surface of what's possible with things like data analytics or artificial intelligence. Journals that take these technological developments seriously will have a huge advantage over the ones that ignore them and "stand still."

Conclusion

The next few years in the publishing industry will be about mastering both continuity and change. They will exist together. It's not one or the other—it's both. If Asian editors understand the journal publishing trends that are not changing—such as quality, reputation, and accessibility—while also embracing both technology and globalization, they will see their efforts rewarded many times over on the global stage.

Conflict of Interest

Author is the chairman of Elsevier. Journals mentioned as example in this article are being published by Elsevier. No other potential conflict of interest relevant to this article was reported.

Report on the 2016 Short Course for Journal Editors at the Council of Science Editors annual meeting

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The Short Course for Journal Editors 2016 was held as a preconference of the 2016 Council of Science Editors (CSE) at the Grand Hyatt Hotel in Denver, Colorado. Four short courses were offered during the first two days of the 2016 CSE annual meeting. The course was attended by 34 participants from many countries, most of whom were editors. Among the participants, 6 were from Africa and 4 from Asia (2 from China, 1 from Japan, and 1 from South Korea). The short course for journal editors was a 2-day program of the CSE, while the others (publication management, journal metrics, and publication ethics) were all single-day programs. I attended the journal editors short course.

The course objectives were to provide (1) “an overview of the roles and responsibilities of scientific journal editors” and (2) “an introduction for newly appointed editors and a refresher for experienced colleagues, providing a survey of the roles and responsibilities of editors of scientific journals.” The lectures were clustered into four broad topics (the fundamentals of editing, the editorial board, journal management, and publishing ethics). Plenty of time for discussion, interaction, and questions was offered during or after the clusters of lectures. Thomas C. Gerber, associate editor of *Mayo Clinic Proceedings* and professor of Medicine and Radiology, Mayo Clinic College of Medicine, was the organizer of the program and invited a carefully selected list of speakers based on his extensive experience.

On the morning of May 14, Day 1, there were five lectures in the cluster on journal publishing basics: (1) setting the scene (“environmental scan”), (2) surviving as a new editor, (3) setting journal priorities, (4) creating a positive culture, and (5) editors and editorial board members.

Bruce Polsky, publishing consultant of *Mayo Clinic Proceedings*, gave a presentation on an environmental scan for science, technology, and medicine (STM) journal editors. He described the current environment of STM journals as “disruptive” because of the following events: (1) Digital publishing eliminates postal delivery fees and print costs for online-only subscribers. (2) Journals are able to cultivate worldwide authorship, readership, and global dissemination of findings. (3) Journals can be accessed by individual users across multiple devices, and cloud-based services allow users to make their content “device independent.” (4) Due to the proliferation of mobile devices, publisher statistics show a 30% increase of website traffic coming from

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mobile devices. (5) Journals need to output content concurrently to multiple devices, operating systems, and platforms. (6) While many users access digital content, the better readers have remained with the print version. (7) The worldwide economy remains moribund; money remains scarce. (8) The Internet has trained viewers to assume all content is free. (9) In constant dollars, NIH appropriations are down nearly 30% since 2003. (10) Pundits suggest open-access now encompasses 10% to 20% of all published science articles.

Christine Casey, editor of *MMWR Serials*, presented a “survival kit” for the journal editor. She recommended that newly appointed editors (1) read the previous year of the journal, (2) know the journal’s history, (3) review the budget and business model, (4) interview those who came before, (5) ask for standard operating procedures, (6) scan the website, (7) become familiar with editorial policies, (8) discover benchmarks in place, (9) mock up an author experience, (10) change or wait 6 months, (11) think about the editor’s and journal’s role in scientific publication, and (12) reflect and write entrance and exit editorials.

David Riley, editor of *The Permanente Journal and Integrative Medicine: A Clinician’s Journal*, gave a presentation on setting priorities for journals. Editors must ask three fundamental questions: (1) what kind of publication would you like to have, (2) who is your audience, and (3) how long is your runway?

Thomas C. Gerber discussed the roles and desirable attributes of editors and editorial board members. He insisted that there are four models for editorial board management: (1) “monarchy (also known as Editor-in-King),” (2) “fraternity officers,” (3) “corporate hierarchy,” and (4) “special forces.” An Editor-in-King may fit a small journal with a limited budget and temporarily benefit a start-up or journal in transition. With the Editor-in-King model, the editorial board viewed as a source of readily available reviewers. In the fraternity officers model, the editor-in-chief and board are highly socialized and desire to please. The corporate hierarchy model may fit large journals with a complex structure and high volume of submissions. The CEO-like status of the editor-in-chief works well for public communications and appearances. In the special forces model, all leadership members are highly qualified and engaged. Creativity, productivity, and flexibility are optimized.

The afternoon session on day 1 was about publishing ethics: (1) authorship, (2) ethics for editors and reviewers, (3) detecting scientific misconduct, and (4) handling scientific misconduct.

Christine Casey discussed authorship and instructions to authors. She provided examples from selected journals’ instructions to authors that can minimize or prevent problems

and described common ethical challenges. She also provided resources that can help journal editors resolve authorship issues.

Margaret Winker, secretary (past president) of the World Association of Medical Editors (WAME), gave a presentation on the ethical obligations of editors and reviewers. She recommended that a journal establish a conflict of interest (COI) policy including the following components: (1) type of COI (financial only or non-financial), (2) length of time (most commonly 5 years), and (3) amount (no magic number). She also described the ethical issues faced by editors, authors, and reviewers; journal policies; the editor’s relationship with the editorial board, owner, and readers; and editor transitions.

Margaret A. Winker gave a presentation on handling allegations of misconduct. She described three case examples in which an anonymous whistleblower alleges data fabrication/falsification, duplicate publication, and duplicate submission. She also led a discussion with the participants about how to handle such allegations.

On May 15, the morning of day 2, there were six lectures in the cluster on business aspects of publishing: (1) business drivers, (2) electronic publication/journal website, (3) making the best of journal material, (4) society-based versus independent journals, (5) working with or without a publisher, and (6) open access and/versus public domain.

Bruce Polsky gave the presentation on business drivers. He divided journal business models into three categories: (1) paid subscription journals (with or without advertising), (2) controlled-circulation publications (rely upon advertising and industry sponsorship, but may seek subscription/licensing revenue), and (3) open-access journals (assess author submission and/or publication fees; less likely to attract industry support). He recommended four principles of the business model of journals: (1) editorial advisors = fiduciaries, (2) customer satisfaction = core objective, (3) society members = primary customers, and (4) integrity = independence.

Thomas C. Gerber gave a presentation on electronic publication and web site design for scientific journals. He pointed out that the journal website must be appealing and engaging and must be part of a content platform. The contents of the website must be discoverable and accessible. The editors must review the website critically at regular intervals.

Christine Casey explained public domain and public access policy. She defined the public domain. Public domain is different from open access, which often has author fees (author page charge), and although material is “freely” available, use is permissible under different types of Creative Commons licenses. She also defined the federal public access policy and described how this affects authors, editors, and publishers and introduced CHORUS, a mechanism to comply with the Pub-

lic Access Policy.

Margaret Winker gave a presentation on open access. Open access publishing can be defined as “the free, immediate, online availability of research articles coupled with the rights to use these articles fully in the digital environment.” There are 6 types of Creative Commons licenses: 2 extremes (CC-BY Attribution, most open; CC BY-NC-ND Attribution-NonCommercial-NoDerivs, most restrictive). Open access journals which are freely available everywhere are called “gold journals.”

The afternoon session was about the “finer points”: (1) peer review, (2) journal metrics, (3) health reporting guidelines, and (4) promoting journal content.

David Riley presented the topic of peer review. The *British Medical Journal* instituted open peer review in 1999 and has been studying the topic ever since. Open (unblinded) peer review has been shown to not adversely affect the quality of peer review. He also noted that many reviews of published articles have shown that peer reviewers fail to detect methodological errors. Some argue that peer review should be abandoned.

David Riley introduced the Health Research Reporting Guidelines and The EQUATOR Network. The EQUATOR (Enhancing the QUALity and Transparency Of health Research) Network’s origins date back to the 1990s and work begun by CONSORT, CONSORT extensions, and other health research reporting guidelines. It is an international initiative to improve the reliability and value of health literature by promoting responsible reporting of health research. Participants have included reporting guideline development groups, journal editors, peer reviewers, medical writers, and funders. At the end of the short course, all participants received certificates of attendance and took a commemorative photograph together.

In my opinion, the Short Course for Journal Editors may differ from the editors’ workshop held by the Korean Council of Science Editors. First, this course presents the big picture of the journal editor’s role. This course included sessions about the fundamentals of editing, the editorial board, journal management, and publishing ethics, giving editors a sense of the entire scope of their responsibilities. Second, plenty of time for discussion, interaction, and questions was offered during or after the clusters of lectures. Third, there was plenty of digital content with the training, including social media, journal websites, metrics, and images.

The 2015 Council of Science Editors annual meeting was

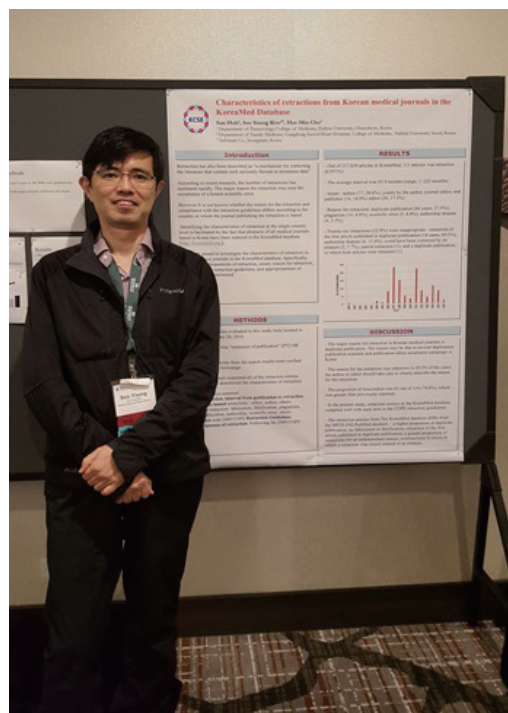


Fig. 1. Author’s presentation of poster at the Council of Science Editors annual meeting in 2016.

held after the short course. There, five poster presentations were held. I presented a poster entitled “Characteristics of retractions from Korean medical journals in the KoreaMed database” (Fig. 1).

In summary, I came away from the short course feeling that many of the presentations and discussions were quite useful and challenging. As the chairperson of the Committee on Education and Training of the Korean Council of Science Editors, I intend to prepare a strategic plan for integrating the best of what I learned from the short course into the editors’ workshop of the Korean Council of Science Editors.

Conflict of Interest

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International Society of Managing and Technical Editors' Asian Conference 2016

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The International Society of Managing and Technical Editors (ISMTE) is an organization that was established in 2007 serving working editors. While the ISMTE annual conference is usually held in the United States or Europe, the 2016 conference was held in Asia for the first time, from April 4th to the 5th at Singapore Clarke Quay Hotel. World-renowned publishers such as Wiley, American Chemical Society Publications, American Institute of Physics, Nature Publishing Group, Wolters Kluwer, Oxford University Press, Elsevier, Taylor & Francis, Thomson Reuters, etc. are registered as corporate members of ISMTE. At this year's conference, publishers and their affiliates such as Editage, Aries systems, Cabell's International, Council of Science Editors, ANSInet, etc. participated as sponsors. Over 100 individuals from all over the world attended the conference in order to improve the quality of academic publishing. The participants were editors belonging to companies that run editing or publishing related businesses, and editors belonging to academic societies or journal editorial boards.

There were a total of 12 sessions during the two-day conference. The first session on April 4th dealt with peer reviews, where lectures titled, "Maintaining publication ethics at scale," "Peer review present and future: ethical issues and challenges," and "Finding value in traditional peer review" were presented. A chairperson introduced the speakers for each of the talks. Representatives from the PLoS (Public Library of Science), the Committee on Publication Ethics (COPE), and American Chemical Society spoke of the need to carry out peer reviews with shared responsibility between authors, reviewers, readers, and academic communities. Initially I was a bit embarrassed when one of the COPE speakers introduced a Korean researcher as an example of a "fake reviewer," but then realized that bringing more attention to this kind of situation might help establish a more reliable peer review system in Korea.

After skimming through the conference schedule, I was most looking forward to the third session. Dr. Jason J. Robert presented a talk titled, "Peer review and editorial office data: measuring and reporting your performance." The speaker introduction mentioned that Dr. Robert currently works at Original Editorial and had previously been a managing editor at Blackwell Publishing. He has mostly edited American medical journals. Moreover, he was the former president of ISMTE and had participated in editing the CONSORT (Consolidated Standards of Reporting Trials), a guide to randomized controlled trials. His presentation consisted of monitored data on how a manuscript develops through peer reviews. The issues he dealt with were all things I had also thought about while managing an editorial committee. For instance,

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time management is an important part of keeping an editorial committee running smoothly. Dr. Robert presented timetables for manuscript management and data for setting deadlines, etc. drawn from simple surveys targeting peer reviewers. Usually, 14 days are given for evaluation, and 76% of reviews are completed in this time frame. A reminder is useful in making sure the evaluations are turned in on time, and data shows a reminder letter delivered seven days before the deadline is the most effective practice. Submission management systems could be altered based on these findings. Dr. Robert plans to conduct an analysis on which reviewers have made helpful comments. Editors must make sure that after a manuscript is submitted, time is not wasted. For example, letting a two-week period pass without selecting peer reviewers would be a waste of time. Although many of the submission management systems used in Korea and elsewhere are based on such findings, I think we should come up with more specific improvements related to better time management.

A buffet-style lunch was served. The tables in the restaurant were labeled with a variety of different topics, allowing participants with similar interests to sit together and converse. This arrangement showed the attentiveness of the organizers.

After lunch, I wandered the halls to look at posters because there wasn't any free time set aside for browsing. There wasn't a separate booth for them; they were exhibited along the walls of the lecture hall. A total of 16 were displayed, but because the break was too short, those wanting to read each one of them or speak with the poster presenters may have felt rushed.

In the afternoon session, two talks on "Metrics: tools for discovering best practices" and four talks on "Open access: navigating the changing landscape" were presented. The speakers presented cases that evaluated the influence of a dissertation using emerging methods such as Altmetrics. Andy Nobes, who is part of a non-profit organization called International Network for the Availability of Scientific Papers which supports research and publication of studies by researchers from developing countries, presented his findings on the current state of open access and the research process in member countries. Audience members asked a variety of questions regarding institution repositories and resources for searching for relevant literature. One asked the speaker to rank the most important factors to consider when searching for references. The speaker replied that the order should be: the relevance to one's discipline, journal impact factor, the reputation of the journal, whether the journal is indexed, the quality of the peer review, the relationship of the journal, whether the journal is open access, and the country the journal was published in. Many audience members were not familiar with Creative Commons or data sharing. The speaker announced the number of open access journals in South

America, India, China, the Philippines, and Vietnam and the names of their indexes. When I asked him why Korean journals weren't included, he said he didn't know where to look for them, which I thought was a poor excuse. I gave him the website addresses to ScienceCentral and Synapse so that he could check the number of Korean journals.

One innovative method that was used to engage participants in this year's conference was the Sli.do tool. The organizers set up a room with a password where participants could enter and freely write down questions during the conference. It was a great way to give and receive feedback, transcending the limits of using a microphone, space, and difference in languages and personalities. The organizers were a bit disappointed that the room was underused, but I believe it could be a useful tool for South Koreans, who aren't used to actively asking questions or expressing their opinions. If possible, I want to utilize this tool at a future conference I organize.

The interests of editors and publishers around the world are changing, and technology is at the forefront of changes to existing perceptions and the nature of academic publishing. In the past when a manuscript had to be printed on paper, there were many limitations regarding the amount of content (e.g., the number of articles in a journal), but with the development of the internet, there is no need for such limitations. Therefore, policies have changed, which in turn have changed the perceptions of editors. On the second day of the conference, talks on "Emerging standards as best practices in scholarly publishing" and "Servicing the journal: breakouts for system managers" reminded us of the efforts to standardize meta-data needed for academic publishing and distribution, using tools such as CrossCheck DOI, FundRef, ORCID, eXtyle, JATS XML, etc. Two submissions systems from Thomson Reuters were introduced, ScholarOne and the Aries System. I also learned how manuscripts are imported into the submission management systems, what mechanism is used to internally handle the article processing charge when the journal is open access, and how to provide editors and reviewers with a more efficient search system.

Small-group panel meetings were also organized at COPE via registration. Speakers and participants discussed real-life cases on publishing ethics, which were submitted beforehand. The panels discussed the same issues on both the first and second day of the conference. I thought that through such panels, in addition to presentations, the organizers diversified the conference and tried to listen to the opinions of the participants. In one such case that was introduced, a paper that was the subject of another author's paper was submitted, so the journal editorial committee rejected the second paper on the grounds of concern for ethics and scientific validity. In



Fig. 1. Korean delegates with the International Society of Managing and Technical Editors President, Michael Willis.

another case, we discussed whether or not authorship could be retracted if a communications writer or academic journal requests confirmation of authorship from the co-author but he or she ignores this request on purpose. While there were no clear-cut solutions to these cases, I realized that there are many issues to think about.

One of the most important issues discussed in academic publishing and editing conferences nowadays is authorship. At ISMTE, many methods to grant author contributions were introduced, such as computation, conceptualization, data curation, data visualization, writing-review, formal analysis, investigation, methodology, project administration, resources, supervision, and testing.

Michael Willis is the chairperson of the ISMTE (Fig. 1). He is part of Wiley, and is the regional manager of the peer review research department. After the photo session, we talked a bit, and it was clear that he was aware of the Council of Asian Science Editors. Through participating in the ISTME this year, I realized that Korean Council of Science Editors and Council of Asian Science Editors workshops and mem-

bership community activities are on par with the level of work around the world.

Although there were many different themes presented at the ISMTE, the three most important were peer review, authorship, and Open Access. The conference was a success on many fronts, in its composition of sessions, the content of the presentations, the speakers, the overall organization of the event, etc. I plan to direct my attention to many of the related fields of study. I thank the ISMTE for presenting the opportunity to consider ways to improve an editorial committee.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Acknowledgments

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What can Asian editors contribute to European editors?

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The 13th European Association of Science Editors (EASE) meeting was held from June 10 to 12, 2016 at the College of Medicine of the University of Strasbourg, Strasbourg, France. This was not the first year that an EASE meeting was held in a small, beautiful city. In fact, I have been participating in EASE meetings since the 11th in 2012 in Tallinn, Estonia. I also participated in the 12th EASE meeting in Split, Croatia in 2014, followed by the most recent EASE meeting. All three were invaluable opportunities for me to acquire knowledge of recent trends in science editing. My other major objective in attending EASE meetings is to communicate with my colleagues—European journal editors. Building relationships with them has enabled me to invite them to Korea and Asian country and ask them to present or manage workshops or seminars for Asian editors. Since 2013, quite a number of editors based in Europe have visited Korea or Asian countries for the meeting of the Korean Council of Science Editors (KCSE, <http://kcse.org>) or Council of Asian Science Editors (<http://asianeditor.org>).

Standards of scientific journal editing have usually been created and disseminated from Western Europe or the United States. Scientific style and format for scholarly journals including reference styles, research and publication ethics, the peer review process, guidelines for good publication, and digital standards have all been products of editors or publishers of those regions. We Asian editors should hurry to catch up with trends in scientific journal publication. It is rare to find any guidelines, reference styles, or digital standards proposed by Asian editors or publishers. We usually end up copying or adapting their approach. It is thus imperative that the KCSE dispatch delegates to the main editors' meeting in North America, that is, the Council of Science Editors, and that in Europe, EASE. Other meetings to which we ought to send delegates are the Association of Learned and Professional Society Publishers, Crossref Annual Meeting, International Society of Managing and Technical Editors, and JATS-Con. When the delegates return from these meetings, the information they have gained and ideas they have discussed are disseminated to Korean editors through newsletters, workshops, or KCSE's official journal about scientific publication, *Science Editing*. One of the reasons for the establishment of KCSE was to create a body to secure and award travel funding to delegates to international editors' or publishers' meetings because it is difficult for each academic society to independently support the cost of travel.

The main topic of discussion during the 13th EASE Meeting in Strasbourg was scientific integrity. The plenary lecture, "Selective publication and the replicability crisis," by Lex M. Bouter

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from the Vrije University, Amsterdam, The Netherlands supplied a key message of the 13th meeting. He explained the concept of “sloppy science.” This is different from scientific fraud, which encompasses fabrication, falsification, and plagiarism. Instead, “sloppy science” refers to “questionable research practices”. These practices include methodological errors; selective reporting of one analysis out of many analyses; answering questions other than those stated in the protocol; refraining from publication if the results are disappointing; and reporting incorrectly in documentation. These poor practices may be prevalent due to the following: unwillingness to share data and materials; insufficient handling and storage of data and materials; insufficient/inadequate mentoring; and unfair review of manuscripts or grant proposals. In a survey of researchers about “questionable research practices,” 34% of them admitted to at least one case of a “questionable research practices” in the previous three years [1]. Lex M. Bouter proposed increasing transparency with open data policies and modifications of the reward system for researchers in order to prevent “questionable research practices” or “sloppy science.” Although research misconduct was a term familiar to me, “sloppy science” and “questionable research practices” were new concepts to me. A more detailed description is available from the speaker’s co-authored article [2].

Other topics presented at the 13th meeting can be explored at the EASE meeting web page: <http://www.ease.org.uk/ease-events/13th-ease-conference-strasbourg-france/>. I had an opportunity to present at the first parallel session, which was moderated by Rachael Lammey from Crossref. The topics of text screening, similarity checking, and statistical screening were presented first. My topic was “How to deal with and screen digital images during the production process,” which comprised definitions of “resolution,” “raster image,” and “vector image”; instructions for preparing image files; and software for screening for falsified images. I presented only simple and basic methods of image screening. Image screening is a professional task since it is difficult to detect the falsified images by the naked eye. Very few journals have implemented image screening. Since images are the most remarkable and easily accessible part of journal articles, the necessity of image screening will grow. We, editors should be prepared to incorporate image screening into the publication process. After the presentation, I discussed image screening with Mihail L. Grecea from Elsevier STM Publishing. He had an interest in the web-based image screening program developed by Heung-Kyu Lee, a professor at the Korea Advanced Institute of Science and Technology. After returning to Korea, I introduced them to each other.

Total 10 posters were presented. I also presented one poster, “Korean medical students’ views on plagiarism and difference

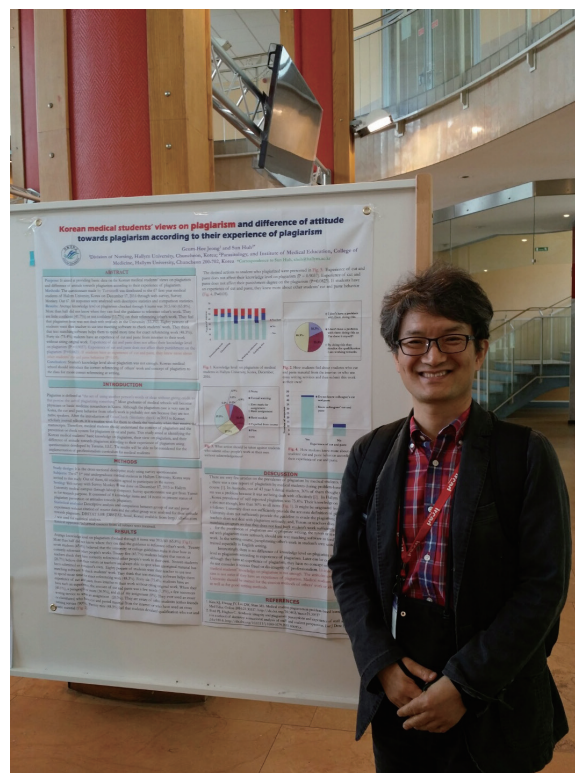


Fig. 1. The author’s poster presentation at the 13th European Association of Science Editors meeting from June 10 to 12, 2016 at the College of Medicine of the University of Strasbourg, Strasbourg, France.

in attitude toward plagiarism according to their experience of plagiarism.” It was interesting to find that students’ attitudes towards plagiarism were not exacting if they had an experience of committing plagiarism (Fig. 1). One of the poster awards was given to Abdolreza Norouzy from Mashhad University of Medical Sciences, Iran, whose poster title was “Exploring the attitudes of medical faculty members in Iran towards research misconduct.” He reported that out of 157 academic members, 43.3% admitted to being involved in at least one type of research or publication misconduct as follows: changing the design, methodology, or results of the study in response to pressure from a funding source; inappropriate assignment of authorship credit; using an inadequate or inappropriate research design; overlooking others’ use of flawed data or questionable interpretation of data; use of someone else’s ideas without obtaining permission or giving due credit, etc. The data on research misconduct is fascinating. It can be expected to be a trigger for Iranian faculty members to promote research ethics at an international level.

At the 13th EASE meeting, 122 participants attended. Among them, there were visitors from Asian countries such as Iran, Turkey, and Korea. In Strasbourg, one presentation in

the parallel session and two posters were presented by Asian editors. Although it is small proportion of the entire program, sharing data from each country was meaningful. At the welcome reception, I met Kathrin Hagmaier, senior editor of *Eurosurveillance*. She asked me about the status of her journal's inclusion in ScienceCentral, the journal article tag suite extensible markup language-based open access scholarly journal database (<http://e-sciencecentral.org/>), which is being maintained by the Korea Federation of Science and Technology Societies. After exchanging messages with engineers who maintain the site in Korea, I immediately determined that her journal's extensible markup language file was being deposited to an old FTP site. I reported to her that the file would be moved to the new site immediately. After returning to Korea, I found that *Eurosurveillance* was presented beautifully through ScienceCentral (<http://www.e-sciencecentral.org/journals/204/>). Thus the EASE meeting was also a good place to collaborate to solve problems for specific projects.

The next EASE meeting, the 14th, will be held in Bucharest, the capital city of Romania, in 2018. I anticipate that a number of Asian editors will participate in and contribute to the 14th meeting. Every two years, going to EASE is a pleasant journey to a beautiful city to meet colleagues who have devoted themselves to journal editing and publishing.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Acknowledgments

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Big lab vs. small lab

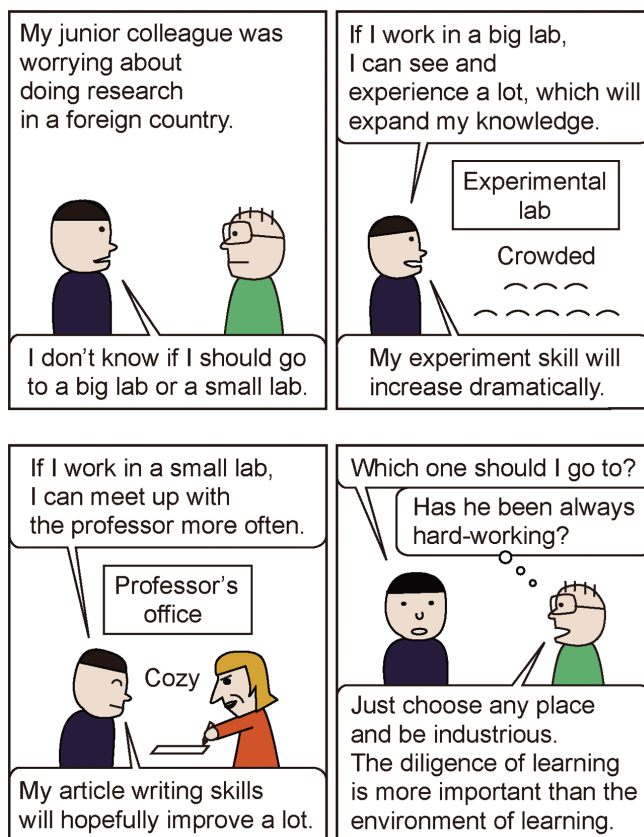
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Episode 150: Big lab vs. small lab



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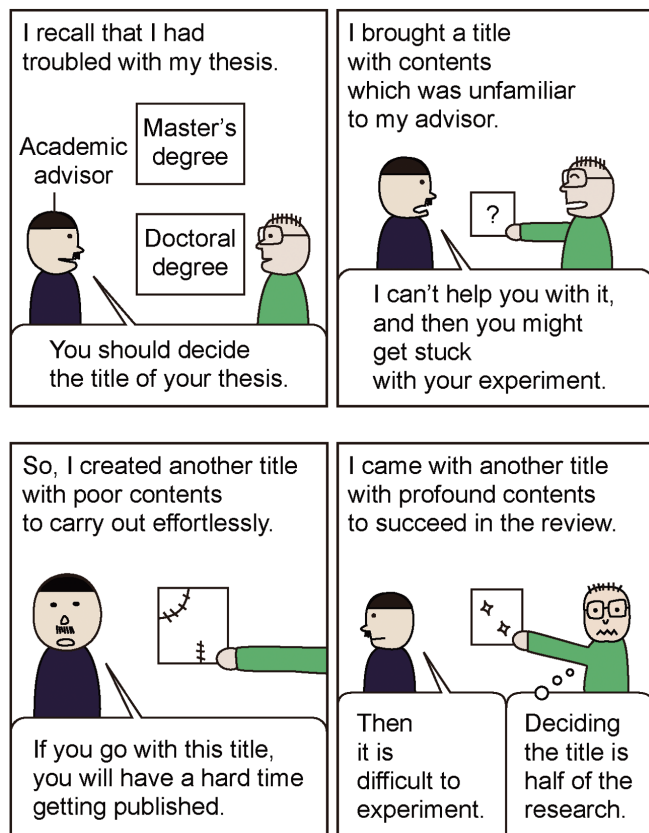
<http://orcid.org/0000-0002-0527-9763>

In reality, when Korean scientists decide to go to the United States to study, they have to take into consideration their family, especially their children. Big cities have much to see and learn, and the public systems including transportation are convenient. However, staying in a small city means that everything is less expensive and the children can pick up English much more quickly. The conclusion is, the location doesn't really matter; the important thing is how adaptive the family is.

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Episode 154: Making title of thesis

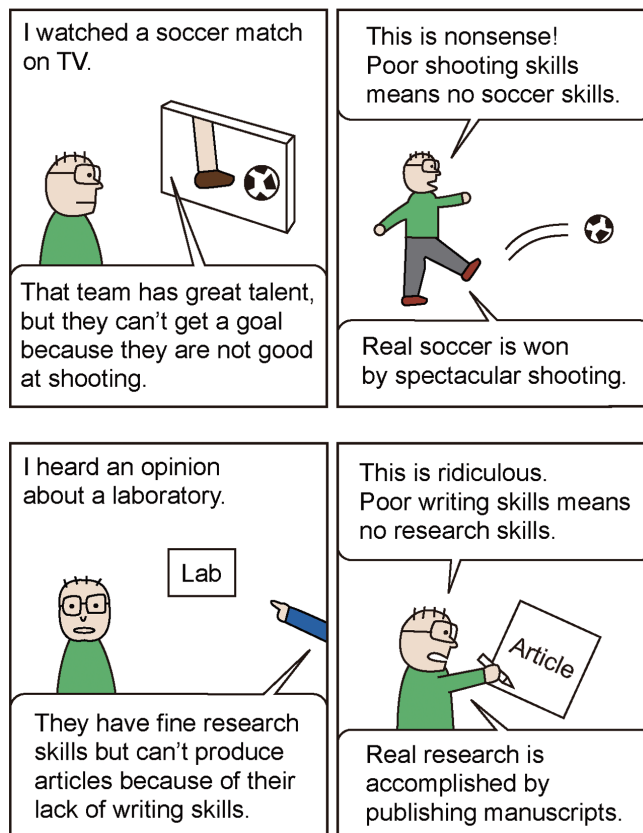


The title of the thesis should be comprehensible to your advisor, and the content should not be too poor or extreme. It may take a few months to decide on the title because you will need to read the references, do pre-experiments, and find solutions. Thanks to this approach, you will earn independence. When an advisor refuses to write the title for your thesis, the advisor is doing you a favor, even if it seems harsh at the moment.

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Episode 162: Shooting ball = Writing article

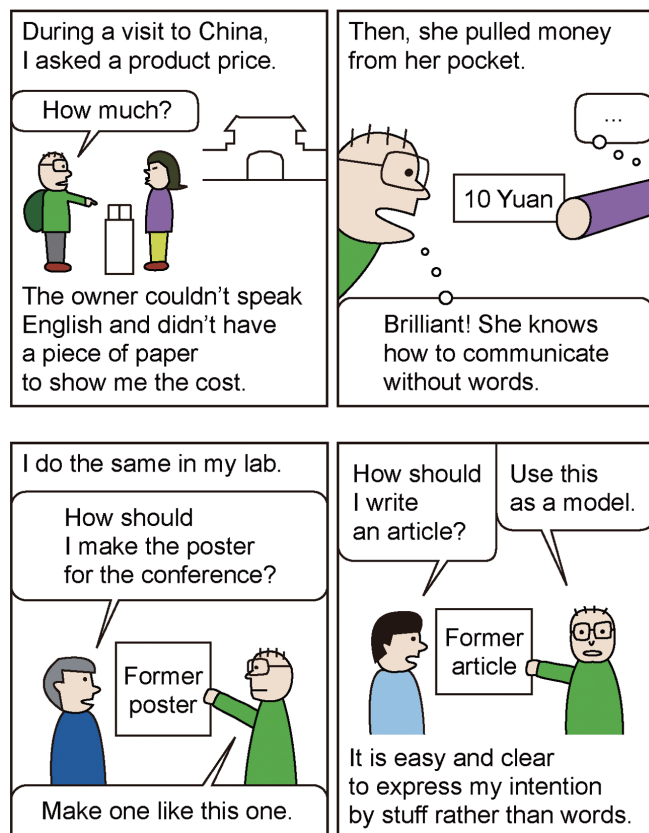


The defense is loose when the soccer ball is far away from the goalpost. However, when the ball is near the goalpost, the defense becomes tight. Therefore, playing near the goalpost is difficult. Likewise, writing an article is a very difficult part of research, because it is the final step of research project.

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Episode 166: Stuff rather than words



Acknowledgments

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I pull out a Chinese map when I travel in China to ask for directions. I don't know Chinese, and some Chinese people can't speak English. Dumb Chinese people respond to me in Chinese anyway, but the clever ones answer in body language. Body language, not English, is the universal language.

Instructions to Authors

Enacted January 1, 2014

1. GENERAL INFORMATION

Science Editing (Sci Ed) is the official journal of the Korean Council of Science Editors (KCSE). Anyone who would like to submit a manuscript is advised to carefully read the aims and scope section of this journal. Manuscripts should be prepared for submission to *Science Editing* according to the following instructions. For issues not addressed in these instructions, the author is referred to the International Committee of Medical Journal Editors (ICMJE) "Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals" (<http://www.icmje.org>).

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3. RESEARCH AND PUBLICATION ETHICS

The journal adheres to the ethical guidelines for research and publication described in Guidelines on Good Publication (<http://publicationethics.org/resources/guidelines>) and the ICMJE Guidelines (<http://www.icmje.org>).

1. Authorship

Authorship credit should be based on 1) substantial contributions to conception and design, acquisition of data, and/or analysis and interpretation of data; 2) drafting the article or revising it critically for important intellectual content; 3) final approval of the version to be published; and 4) agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. Every author should meet all of these four conditions. After the initial submission of a manuscript, any changes whatsoever in au-

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Submitted manuscripts must not have been previously published or be under consideration for publication elsewhere. No part of the accepted manuscript should be duplicated in any other scientific journal without the permission of the Editorial Board. If duplicate publication related to the papers of this journal is detected, the manuscripts may be rejected, the authors will be announced in the journal, and their institutions will be informed. There will also be penalties for the authors.

A letter of permission is required for any and all material that has been published previously. It is the responsibility of the author to request permission from the publisher for any material that is being reproduced. This requirement applies to text, figures, and tables.

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It is possible to republish manuscripts if the manuscripts satisfy the conditions of secondary publication of the ICMJE Recommendations (http://www.icmje.org/urm_main.html).

4. Conflict of Interest Statement

The corresponding author must inform the editor of any po-

tential conflicts of interest that could influence the authors' interpretation of the data. Examples of potential conflicts of interest are financial support from or connections to companies, political pressure from interest groups, and academically related issues. In particular, all sources of funding applicable to the study should be explicitly stated.

5. Statement of Informed Consent and Institutional Review Board Approval

Copies of written informed consent documents should be kept for studies on human subjects. For clinical studies of human subjects, a certificate, agreement, or approval by the Institutional Review Board (IRB) of the author's institution is required. If necessary, the editor or reviewers may request copies of these documents to resolve questions about IRB approval and study conduct.

6. Process for Managing Research and Publication Misconduct

When the journal faces suspected cases of research and publication misconduct such as redundant (duplicate) publication, plagiarism, fraudulent or fabricated data, changes in authorship, an undisclosed conflict of interest, ethical problems with a submitted manuscript, a reviewer who has appropriated an author's idea or data, complaints against editors, and so on, the resolution process will follow the flowchart provided by the Committee on Publication Ethics (<http://publication-ethics.org/resources/flowcharts>). The discussion and decision on the suspected cases are carried out by the Editorial Board.

7. Editorial Responsibilities

The Editorial Board will continuously work to monitor and safeguard publication ethics: guidelines for retracting articles; maintenance of the integrity of the academic record; preclusion of business needs from compromising intellectual and ethical standards; publishing corrections, clarifications, retractions, and apologies when needed; and excluding plagiarism and fraudulent data. The editors maintain the following responsibilities: responsibility and authority to reject and accept articles; avoiding any conflict of interest with respect to articles they reject or accept; promoting publication of corrections or retractions when errors are found; and preservation of the anonymity of reviewers.

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1. Author Qualifications

Any researcher throughout the world can submit a manuscript if the scope of the manuscript is appropriate.

2. Language

Manuscripts should be submitted in good scientific English.

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1. Submission

All manuscripts should be submitted to kcse@kcse.org by the corresponding author.

2. Peer Review Process

Science Editing reviews all manuscripts received. A manuscript is first reviewed for its format and adherence to the aims and scope of the journal. If the manuscript meets these two criteria, it is dispatched to three investigators in the field with relevant knowledge. Assuming the manuscript is sent to reviewers, *Science Editing* waits to receive opinions from at least two reviewers. In addition, if deemed necessary, a review of statistics may be requested. The authors' names and affiliations are removed during peer review. The acceptance criteria for all papers are based on the quality and originality of the research and its scientific significance. Acceptance of the manuscript is decided based on the critiques and recommended decision of the reviewers. An initial decision will normally be made within 4 weeks of receipt of a manuscript, and the reviewers' comments are sent to the corresponding author by e-mail. The corresponding author must indicate the alterations that have been made in response to the reviewers' comments item by item. Failure to resubmit the revised manuscript within 4 weeks of the editorial decision is regarded as a withdrawal. A final decision on acceptance/rejection for publication is forwarded to the corresponding author from the editor.

6. MANUSCRIPT PREPARATION

1. General Requirements

- The main document with manuscript text and tables should be prepared in an MS Word (docx) or RTF file format.
- The manuscript should be double spaced on 21.6 × 27.9 cm (letter size) or 21.0 × 29.7 cm (A4) paper with 3.0 cm margins at the top, bottom, right, and left margin.
- All manuscript pages are to be numbered at the bottom consecutively, beginning with the abstract as page 1. Neither the author's names nor their affiliations should appear on the manuscript pages.
- The authors should express all measurements according to International System (SI) units with some exceptions such as seconds, mmHg, or °C.
- Only standard abbreviations should be used. Abbrevia-

tions should be avoided in the title of the manuscript. Abbreviations should be spelled out when first used in the text—for example, extensible markup language (XML)—and the use of abbreviations should be kept to a minimum.

- The names and locations (city, state, and country only) of manufacturers should be given.
- When quoting from other sources, a reference number should be cited after the author's name or at the end of the quotation.

Manuscript preparation is different according to the publication type, including original articles, reviews, case studies, essays, editorials, book reviews, and correspondence. Other types are also negotiable with the Editorial Board.

2. Original Articles

Original articles are reports of basic investigations. Although there is no limitation on the length of the manuscripts, the Editorial Board may abridge excessive illustrations and large tables. The manuscript for an original article should be organized in the following sequence: title page, abstract and keywords, main text (introduction, methods, results, and discussion), acknowledgments, references, tables, figure legends, and figures. The figures should be received as separate files. Maximum length: 2,500 words of text (not including the abstract, tables, figures, and references) with no more than a total of 10 tables and/or figures.

- **Title page:** The following items should be included on the title page: 1) the title of the manuscript, 2) author list, 3) each author's affiliation, 4) the name and e-mail address of the corresponding author, 5) when applicable, the source of any research funding and a list of where and when the study has been presented in part elsewhere, and 6) a running title of fewer than 50 characters.
- **Abstract and Keywords:** The abstract should be one concise paragraph of less than 250 words in an unstructured format. Abbreviations or references are not allowed in the abstract. Up to 5 keywords should be listed at the bottom of the abstract to be used as index terms.
- **Introduction:** The purpose of the investigation, including relevant background information, should be described briefly. Conclusions should not be included in the Introduction.
- **Methods:** The research plan, materials (or subjects), and methods used should be described in that order. The names and locations (city, state, and country only) of manufacturers of equipment and software should be given. Methods of statistical analysis and criteria for statistical significance should be described.
- **Results:** The results should be presented in logical se-

quence in the text, tables, and figures. If resulting parameters have statistical significance, P-values should be provided, and repetitive presentation of the same data in different forms should be avoided. The results should not include material appropriate for the discussion.

- **Discussion:** Observations pertaining to the results of the research and other related work should be interpreted for readers. New and important observations should be emphasized rather than merely repeating the contents of the results. The implications of the proposed opinion should be explained along with its limits, and within the limits of the research results, and the conclusion should be connected to the purpose of the research. In a concluding paragraph, the results and their meaning should be summarized.
- **Conflict of interest:** Any potential conflict of interest that could influence the authors' interpretation of the data, such as financial support from or connections to companies, political pressure from interest groups, or academically related issues, must be stated.
- **Acknowledgments:** All persons who have made substantial contributions, but who have not met the criteria for authorship, are to be acknowledged here. All sources of funding applicable to the study should be stated here explicitly.
- **References:** In the text, references should be cited with Arabic numerals in brackets, numbered in the order cited. In the references section, the references should be numbered and listed in order of appearance in the text. The number of references is limited to 20 for original articles. All authors of a cited work should be listed if there are six or fewer authors. The first three authors should be listed followed by "et al." if there are more than six authors. If a reference has a digital object identifier (DOI), it should be supplied. Other types of references not described below should follow *The NLM Style Guide for Authors, Editors, and Publishers* (<http://www.nlm.nih.gov/citingmedicine>).

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11. Kim R. SNU ranked 51st in university evaluation. Korean Times [Internet]. 2007 Nov 8 [cited 2013 Sep 25]. Available from: http://www.koreatimes.co.kr/www/news/nation/2007/11/117_13423.html

Dissertations:

12. Kim K. Quantum critical phenomena in superfluids and superconductors [dissertation]. Pasadena, CA: California Institute of Technology; 1991.

- **Tables:** Tables are to be numbered in the order in which they are cited in the text. A table title should concisely describe the content of the table so that a reader can understand the table without referring to the text. Each table must be simple and typed on a separate page with its heading above it. Explanatory matter is placed in foot-

notes below the tabular matter and not included in the heading. All non-standard abbreviations are explained in the footnotes. Footnotes should be indicated by ^{a)}, ^{b)}, ^{c)}, Statistical measures such as SD or SE should be identified. Vertical rules and horizontal rules between entries should be omitted.

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Reviews are invited by the editor and should be comprehensive analyses of specific topics. They are to be organized as follows: title page, abstract and keywords, main text (introduction, text, and conclusion), acknowledgments, references, tables, figure legends, and figures. There should be an unstructured abstract of no more than 200 words. The length of the text excluding references, tables, and figures should not exceed 5,000 words. The number of references is limited to 100.

4. Case studies

Case studies are intended to report practical cases that can be encountered during editing and publishing. Examples include interesting cases of research misconduct and publication ethics violations; experience of new and creative initiatives in publishing; and the history of a specific journal development. They are to be organized as follows: title page, abstract and keywords, main text (introduction, text, and conclusion), acknowledgments, references, tables, figure legends, and figures. There should be an unstructured abstract of 200 words maximum. The length of the text excluding references, tables, and figures should not exceed 2,500 words. The number of references is limited to 20.

5. Essays

Essays are for the dissemination of the experience and ideas of editors for colleague editors. There is no limitation on the topics if they are related to editing or publishing. They are to be organized as follows: title page, abstract and keywords, main text (introduction, text, and conclusion), acknowledgments, references, tables, figure legends, and figures. There should be an unstructured abstract equal to or less than 200 words. The length of the text excluding references, tables, and

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Editorials are invited by the editor and should be commentaries on articles published recently in the journal. Editorial topics could include active areas of research, fresh insights, and debates in all fields of journal publication. Editorials should not exceed 1,000 words, excluding references, tables, and figures. References should not exceed 10. A maximum of 3 figures including tables is allowed.

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Book reviews are solicited by the editor. These will cover recently published books in the field of journal publication. The format is same as that of Editorials.

8. Correspondence

Correspondence (letters to the editor) may be in response to a published article, or a short, free-standing piece expressing an opinion. Correspondence should be no longer than 1,000 words of text and 10 references.

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9. Video Clips

Video clips can be submitted for placement on the journal website. All videos are subject to peer review and must be sent directly to the editor by e-mail. A video file submitted for consideration for publication should be in complete and final format and at as high a resolution as possible. Any editing of the video will be the responsibility of the author. *Science Editing* accepts all kinds of video files not exceeding 30 MB and of less than 5 minutes duration, but Quicktime, AVI, MPEG, MP4, and RealMedia file formats are recommended. A legend to accompany the video should be double-spaced in a separate file. All copyrights for video files after acceptance of the main article are automatically transferred to *Science Editing*.

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Unsolicited manuscript with publication types of original articles, case studies, essays, and correspondence can be submitted. Other publication types are all commissioned or invited by the Editorial Board.

Table 1 shows the recommended maximums of manuscripts according to publication type; however, these requirements are negotiable with the editor.

Table 1. Recommended maximums for articles submitted to *Science Editing*

Type of article	Abstract (word)	Text (word) ^{a)}	References	Tables & figures
Original article	250	2,500	20	10
Review	200	5,000	100	No limits
Case study	200	2,500	20	10
Essay	200	2,500	20	10
Editorial	No	1,000	10	3
Book review	No	1,000	10	3
Correspondence	No			
Letter to the editor	-	1,000	10	3
In reply	-	500	5	3
Video clip	No	30 MB, 5 min	-	-

^{a)}Maximum number of words is exclusive of the abstract, references, tables, and figure legends.

7. FINAL PREPARATION FOR PUBLICATION

1. Final Version

After the paper has been accepted for publication, the author(s) should submit the final version of the manuscript. The names and affiliations of the authors should be double-checked, and if the originally submitted image files were of poor resolution, higher resolution image files should be submitted at this time. Color images must be created as CMYK files. The electronic original should be sent with appropriate labeling and arrows. The EPS, TIFF, Adobe Photoshop (PSD), JPEG, and PPT formats are preferred for submission of digital files of photographic images. Symbols (e.g., circles, triangles, squares), letters (e.g., words, abbreviations), and numbers should be large enough to be legible on reduction to the journal's column widths. All of the symbols must be defined in the figure caption. If the symbols are too complex to appear in the caption, they should appear on the illustration itself, within the area of the graph or diagram, not to the side. If references, tables, or figures are moved, added, or deleted during the revision process, they should be renumbered to reflect such changes so that all tables, references, and figures are cited in numeric order.

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poned to the next issue.

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The author(s) will receive the final version of the manuscript as a PDF file. Upon receipt, within 2 days, the editorial office (or printing office) must be notified of any errors found in the file. Any errors found after this time are the responsibility of the author(s) and will have to be corrected as an erratum.

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- ☐ All table and figure numbers are found in the text.
- ☐ Figures as separate files, in EPS, TIFF, Adobe Photoshop (PSD), JPEG, or PPT format.
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