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## Aims and scope

Science Editing (Sci Ed) is the official journal of the Korean Council of Science Editors (<https://kcse.org>) and Council of Asian Science Editors (<https://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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## About the journal

It launched in February 20, 2014 with volume 1 and number 1. It is to be published biannually. Supplement issues may be published. Circulation number of print copies is 500 per issue. Full text is freely available from: <https://www.escienceediting.org> or <http://e-se.org>. It is the member journal of Council of Science Editors, the Association of Learned and Professional Society Publishers, and European Association of Science Editors. There is no page charge or article processing charge of author side. This journal had been supported by the Korean Federation of Science and Technology Societies, the Government of the Republic of Korea (2013-2014).

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Korean Council of Science Editors  
The Korea Science & Technology Center 2nd floor,  
22 Teheran-ro 7-gil, Gangnam-gu, Seoul 06130, Korea  
Tel: +82-2-3420-1390, Fax: +82-2-563-4931  
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## Artificial intelligence and publishing

Kihong Kim

Department of Physics, Ajou University, Suwon, Korea

If I judge from the buzzwords I encounter frequently these days, from lunch conversations, seminar announcements, news headlines and research paper titles, I get an impression that the age of artificial intelligence (AI) has already arrived. According to the internet preprint site arXiv.org (<https://arxiv.org>), which I visit frequently, over 2,000 preprints closely related to AI were posted in the category of physics during the last twelve months. Note that most of these papers are not about the research of AI itself but about the application of AI to solving problems in physics. I found that this number grew exponentially during the last five years. Does this imply that AI techniques have been developed sufficiently so that they can be used to solve new physics problems? The majority of physicists I talked to seemed to disagree, claiming that AI-based studies had only confirmed some known results and not yet provided unanticipated solutions to new problems. Of course, there exist some areas of research where AI is definitely useful, such as big data analysis and material design. Nevertheless, some cautious people claim that AI cannot be as creative as humans and will never completely replace them. Is this true?

A famous event through which AI technology became known to the general public was the five-game Go match between AlphaGo and Lee Sedol held in Korea in 2016. I watched several matches on TV, where two professional Go players explained each move. I remember one occasion where the commentators said that a move by AlphaGo was extremely strange and it was perhaps a bad mistake. Later it turned out to be a brilliant move the two commentators agreed that no human Go player could possibly think of. I thought it was something similar to a new discovery in science and was well-qualified to be called creative. Will AI advance to such a degree that it becomes as creative as top-level scientists and creates new branches of knowledge? Will it become more intelligent than human beings someday? If humans can create something that is more intelligent than themselves, what kind of sense does it make in terms of the theory of evolution?

An important part of intelligence is the ability to process language. Since language is the main medium of publishing, it is not surprising that AI technology has been actively developed for and applied to the publishing industry. A large number of AI-based software tools aiming at assisting academic publishing have appeared recently. They can be used in all stages of journal publishing, including peer review, editing and production. Many big publishers such as Taylor & Francis, Elsevier and Springer Nature seem to be involved with developing various AI tools for publishing, in collaboration with software companies. Especially, the tools which can assist peer review processes are of great current interest [1]. These tools can be used to find peer reviewers, check statistics, provide a summary of a paper's findings, detect plagiarism and

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**Correspondence to** Kihong Kim  
[khkim@ajou.ac.kr](mailto:khkim@ajou.ac.kr)

**ORCID**  
Kihong Kim  
<https://orcid.org/0000-0001-9965-3535>

identify data and image fabrications, in a manner much better than traditional methods. I find manuscript analysis tools, such as the one being developed by ScholarOne and UNSILO, to be very interesting. They aim to analyze manuscripts using natural language processing and machine learning and provide an overview of a paper in relation to other papers on related problems, as well as to detect possible inconsistencies and plagiarism. I think if this kind of tool is developed successfully, it can be quite useful not only to editors but also to researchers and authors. A similar system can be used to provide researchers an overview of their paper, find the most appropriate references and even suggest new directions of research. In other words, it could effectively function as an AI research advisor. Nowadays the literature search is a substantial burden to researchers and the references quoted in many papers are not very accurate [2]. In my opinion, the current way of evaluating researchers and journals based primarily on the number of citations is seriously flawed and hurting the spirit of academism. AI-based tools may be able to provide an alternative better way to evaluate researchers and journals.

There are numerous other developments based on AI technology. Tools aiming to check statistics such as StatReviewer by Aries Systems and to automate and expedite manuscript editing and production processes such as Smart Edit by Cen-

veo are such examples. Since adopting AI-based tools requires large resources, it has largely been limited to big publishers. However, I expect the situation to change rapidly and more and more affordable tools for researchers, authors, editors and publishers to appear. Judging from the pace at which AI technology has evolved, I anticipate that it will completely change the ways scientists do research and publishers produce journals in a not very far future. Everybody including those in small publishers needs to be alert to AI technology.

## Conflict of Interest

Kihong Kim has been the editor of *Science Editing* since 2014.

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# Ethical challenges regarding artificial intelligence in medicine from the perspective of scientific editing and peer review

Seong Ho Park<sup>1</sup>, Young-Hak Kim<sup>2</sup>, Jun Young Lee<sup>3</sup>, Soyoung Yoo<sup>4</sup>, Chong Jai Kim<sup>5</sup>

<sup>1</sup>Department of Radiology and Research Institute of Radiology, <sup>2</sup>Cardiology Division, Asan Medical Center, University of Ulsan College of Medicine, Seoul; <sup>3</sup>National IT Industry Promotion Agency, Jincheon; <sup>4</sup>Health Innovation Big Data Center, Asan Medical Center, Seoul; <sup>5</sup>Department of Pathology, Asan Medical Center, University of Ulsan College of Medicine, Seoul, Korea

## Abstract

This review article aims to highlight several areas in research studies on artificial intelligence (AI) in medicine that currently require additional transparency and explain why additional transparency is needed. Transparency regarding training data, test data and results, interpretation of study results, and the sharing of algorithms and data are major areas for guaranteeing ethical standards in AI research. For transparency in training data, clarifying the biases and errors in training data and the AI algorithms based on these training data prior to their implementation is critical. Furthermore, biases about institutions and socioeconomic groups should be considered. For transparency in test data and test results, authors should state if the test data were collected externally or internally and prospectively or retrospectively at first. It is necessary to distinguish whether datasets were convenience samples consisting of some positive and some negative cases or clinical cohorts. When datasets from multiple institutions were used, authors should report results from each individual institution. Full publication of the results of AI research is also important. For transparency in interpreting study results, authors should interpret the results explicitly and avoid over-interpretation. For transparency by sharing algorithms and data, sharing is required for replication and reproducibility of the research by other researchers. All of the above mentioned high standards regarding transparency of AI research in healthcare should be considered to facilitate the ethical conduct of AI research.

## Keywords

Artificial intelligence; Ethics; Research; Publishing; Bias

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**Correspondence to** Seong Ho Park  
[seongho@amc.seoul.kr](mailto:seongho@amc.seoul.kr)

## ORCID

Seong Ho Park  
<https://orcid.org/0000-0002-1257-8315>  
Young-Hak Kim  
<https://orcid.org/0000-0002-3610-486X>  
Jun Young Lee  
<https://orcid.org/0000-0003-0698-2036>  
Soyoung Yoo  
<https://orcid.org/0000-0002-2953-508X>  
Chong Jai Kim  
<https://orcid.org/0000-0002-2844-9446>

## Introduction

Artificial intelligence (AI), which makes use of big data based on advanced machine learning techniques involving multiple layers of artificial neural networks (i.e., deep learning), has the potential to substantially improve many aspects of healthcare [1]. With new technological developments, new ethical issues are also introduced. Many international authorities, including some in the medical field, are attempting to establish ethical guidelines regarding the use of AI [2-5]. Healthcare is a field in which the implementation of AI involves multiple ethical challenges. Notable ethical issues related to AI in healthcare are listed in Table 1 (not exhaustive) [1,2,6-22]. AI is unlikely to earn trust from patients and healthcare professionals without addressing these ethical issues adequately.

Some of these ethical issues are relevant to the scientific editing and peer review processes of academic journals. Transparency is one of the key ethical challenges surrounding AI in healthcare [23]. The scientific editing and peer review processes of medical journals are well positioned to ensure that studies on AI in healthcare are held to a high standard of transparency, thereby facilitating the ethical conduct of research studies and the ethical spread of knowledge. The role of peer-reviewed medical journals in this field is particularly important because many research studies on AI in healthcare are published without peer review through preprint servers, such as arXiv.org, most of which are not accepted by the medical field [1,24]. This article highlights several specific areas in research studies on AI in healthcare that currently require additional transparency, explains why additional transparency is needed, and discusses how to achieve it from the perspective of scientific editing and peer review. This article can serve as a guide for authors and reviewers to ensure that research reports on AI in healthcare are held to a high standard of transparency. However, it is not intended to serve as an all-inclusive guide for writing and reviewing research articles on AI in healthcare, nor is it intended to provide general ethical guide-

lines for AI in healthcare. More general guides can be found elsewhere [2-5,25].

## Transparency in Training Data

Reports of research studies on AI in healthcare should explain the details of how authors collected, processed, and organized the data used in studies thoroughly (with specific mention of dates and medical institutions), in addition to describing the baseline demographic characteristics, clinical characteristics (such as the distribution of severity of the target condition, distribution of alternative diagnoses, and comorbidities), and technical characteristics (such as techniques for image acquisition) of the collected data thoroughly to help readers understand biases and errors in the data [13,23,25,26]. In both academia and industry, researchers are praised for training increasingly sophisticated algorithms. However, relatively little attention is paid to how data are collected, processed, and organized [13]. Therefore, improvements in this area are needed. Several related guidelines are available to assist in transparent reporting [25,27-29].

Modern AI algorithms built using big data and multiple layers of artificial neural networks have achieved superior accuracy compared to past algorithms. However, current AI algorithms are strongly dependent on their training data. The accuracy of these algorithms cannot go beyond the information inherent to the datasets on which they are trained, meaning they cannot avoid the biases and errors in the training data. Because the datasets used to train AI algorithms for medical diagnosis/prediction are prone to selection biases and may not adequately represent a target population in real-world scenarios for various reasons (explained below), this strong dependency on training data is particularly concerning. Clarifying the biases and errors in training data and AI algorithms based on these training data prior to their implementation is critical, especially given the black box nature of AI and the fact that cryptic biases and errors can harm nu-

**Table 1.** Notable ethical issues related to AI in healthcare (not exhaustive)

Ethical issue
Privacy and data protection, consent for data use, and data ownership.
Fairness and bias in data and AI algorithms. If data underrepresent any particular groups of patients (e.g., ethnicity, gender, and economic status), then the resulting AI algorithms will have biases against these groups.
Evidence to ensure the greatest benefit to patients while avoiding any harm (i.e., rigorous clinical validation of AI).
Equitable access (e.g., if resource-poor hospitals and patients have limited access to AI, disparities in healthcare may be exacerbated).
Conflicts of interest (e.g., if healthcare professionals involved in patient care hold positions in AI startups or other commercial entities, it may increase the risk that professional judgment or actions regarding a primary interest will be unduly influenced by a secondary interest).
Accountability (i.e., who should be liable for adverse events related to the use of AI?).
The exploitation of AI for unethical purposes (e.g., manipulating AI outputs with malicious intent by covertly modifying data to perform an adversarial attack [20]).

AI, artificial intelligence.

merous patients simultaneously and negatively affect health disparities at a large scale [10].

Complex mathematical AI models for medical diagnosis/prediction require a large quantity of data for training. Producing and annotating this magnitude of medical data is resource intensive and difficult [13,22,30,31]. Additionally, the medical data accumulated in clinical practice are generally heterogeneous across institutions and practice settings based on variations in patient composition, physician preference, equipment and facilities, and health policies. Many data are also unstructured and unstandardized in terms of both their final form and process of acquisition. Missing data are also relatively common. As a result, most clinical data, whether from electronic health records or medical billing claims, are poorly defined and largely insufficient for effective exploitation by AI techniques [16,32]. In other words, they are “not AI ready” [16,22,31,32], which makes the data collection and curation process even more difficult. Therefore, researchers who collect big medical data to develop AI algorithms might rely on whatever data are available, even if these data are prone to various selection biases [13,30,33]. Existing large public medical datasets are also used for developing AI. However, few such databases are currently available, and most are small and lack real-world variation [2,25,32]. Additionally, any assumptions or hidden biases within such data may not be explicitly known [2,25,32].

Dataset shifting in medicine poses another challenge. In disciplines where medical equipment for generating data evolves rapidly (such as various radiologic scanners), dataset shifting occurs relatively frequently [2,9]. For example, if an AI algorithm is trained only on images from a 1.5-Tesla magnetic resonance imaging scanner, it may or may not output the same results for examinations performed using a 3-Tesla magnetic resonance imaging scanner.

Biases in medical data are sometimes macroscopic [2,10-12,16]. For example, electronic health records and insurance claim datasets are records of patient’s clinical courses, but they also serve as a tool for healthcare providers to justify specific levels of reimbursement. Consequently, data may reflect reimbursement strategies and payment mechanisms more than providing an objective clinical assessment. As another example, health record data may contain biases for or against a particular race, gender, or socioeconomic group. However, in many cases, the biases are complex and difficult to anticipate [2,12]. Such biases may manifest as inadvertent discrimination against under-represented subsets of a population, limited interoperability (algorithms trained on patients from a single institution may not be generalizable across different institutions and populations), and the frame problem [2,10,17]. The frame problem is exemplified by a recent accident caused

by an experimental autonomous driving car from Tesla that crashed into the trailer of a truck turning left, killing the driver, because it failed to recognize the white side of the trailer as a hazard [10]. Simply put, AI cannot classify what it is not trained on. This raises significant concerns in medicine because unexpected situations can occur in real-world clinical practice at any time, and such situations are not infrequent. Any anticipated biases in data, as well as any unintended consequences and pitfalls that can occur based on these biases, should be transparently disclosed in research reports.

## Transparency in Test Data and Test Results

In addition to the points raised in the previous section regarding transparency of training data, there are several other points worth noting regarding the transparency of datasets for testing the performance of AI algorithms. Firstly, for the same reasons mentioned above, external validation (i.e., assessing the performance of an AI algorithm using datasets collected independently from the training dataset) is essential when testing the performance of an AI algorithm for medical diagnosis/prediction [10,13,17,18,25,26,33,34]. Computer scientists evaluate algorithms on test datasets, but these are typically subsamples (such as random-split samples) of the original dataset from which the training data were also drawn, meaning they are likely to contain the same biases [13,35]. Research reports should clearly distinguish preliminary performance evaluations using split subsamples from genuine external validations. The lack of adequate external validation for AI algorithms designed for medical diagnosis/prediction is a pressing concern [35]. According to a recent systematic review of the research studies published between January 1, 2018, and August 17, 2018, that investigated the performance of AI algorithms for analyzing medical images to provide diagnostic decisions, only 6% performed some type of external validation [35]. A clear editorial guide regarding external validation will promote adequate external validation.

Secondly, when describing the process of collecting test datasets, it is necessary to distinguish whether datasets were convenience samples consisting of some positive and some negative cases or clinical cohorts that adequately reflect the epidemiological characteristics and disease manifestation spectrum of clinically-defined target patients in real-world practice [36]. The former is referred to as diagnostic case-control design, while the latter is referred to as diagnostic cohort design [36-38]. For example, when testing an AI algorithm that detects lung cancer on chest radiographs, testing its performance on a dataset consisting of some cases with lung cancer and some cases without lung cancer is a diagnostic case-control design [36]. By contrast, a diagnostic cohort de-

sign defines the clinical setting and patients first by establishing eligibility criteria. For example, a study might consider asymptomatic adults aged X–Y years with Z-packs-per-year smoking history. Then, all (or a random selection) of those who fulfilled the criteria within a certain period are recruited and examined by the AI algorithm. It is recommended to perform a diagnostic cohort study in a prospective manner.

A diagnostic cohort is a better representation of real-world practice than a convenience case-control sample because it has a more natural prevalence of disease, more natural demographic characteristics, and a more natural disease manifestation spectrum including patients with disease-simulating conditions, comorbidities that may pose diagnostic difficulty, and findings for which the concrete distinction of disease versus non-disease is inappropriate [36]. Case-control design is prone to spectrum bias, which can potentially lead to an inflated estimation of diagnostic performance [33,39]. A diagnostic cohort design not only results in a less biased estimation of the clinical performance of an AI algorithm, but it also allows for the assessment of higher-level endpoints that are more clinically relevant, such as positive predictive value (or post-test probability), diagnostic yield, and the rate of false referrals [17,35,38].

A diagnostic cohort study using AI should describe patient eligibility criteria explicitly; it should also clarify the reasons and subject numbers for any incidents of individuals who were eligible but unenrolled, or those who were enrolled but were not included in the analysis of study outcomes [27,29]. Typical reasons for such incidents include technical failure, drop-out/follow-up loss, and missing reference standard information.

Finally, for the same reasons mentioned above, the performance of an AI algorithm may vary across different institutions [40–43]. Therefore, it is essential to use test datasets from multiple institutions and report all individual institutional results to assess the interoperability of an AI algorithm and generalizability of study results accurately. Underreporting of negative or unfavorable study results is a well-known pitfall in medical research in general; similarly, some researchers or sponsors of AI research studies may be inclined to report favorable results selectively. Underreporting of negative or unfavorable study results was a significant reason why the policy of prospectively registering clinical trials was first introduced in 2005 by the International Committee of Medical Journal Editors. Currently, numerous medical journals consider reports of clinical trials for publication only if they have been registered *a priori* in publicly accessible trial registries (e.g., [clinicaltrials.gov](http://clinicaltrials.gov)) with key study plans.

Transparency through the full publication of the results of AI research is equally important [15,25,26,44]. A similar re-

quirement for the prospective registration of studies for clinical validation of AI algorithms will help increase confidence in study results among patients and healthcare professionals, as well as in the process of regulatory approval. In fact, the requirement for prospective registration of diagnostic test accuracy studies has already been proposed by some medical journals [45]. Studies to validate the clinical performance of AI algorithms belong to the broader category of diagnostic test accuracy studies. Therefore, the adoption of this policy would have an instant effect.

## Transparency in Interpreting Study Results

The interpretation of results in research reports on AI in healthcare should be explicit and avoid over-interpretation (also referred to as “spin”) [46]. Because AI in healthcare is a topic in which not only related professionals but also the public have considerable interest, the reporting of research studies should consider laypeople as potential readers. An explicit interpretation of study results without spin is critical to prevent misinforming the public or lay media. Spinning study results may make a study “look better.” However, excessive hype [1] that is generated inadvertently or exacerbated through misinformation will ultimately erode faith in AI for both the public and healthcare professionals. The scientific editing and peer review processes play an important role in building trust in AI by publishing clearer, more accurate information.

Typical examples of spinning study results include describing the results from split samples as external validation, claiming proof of clinical validity or utility for a limited external validation using diagnostic case-control design, and claiming evidence regarding the impact on healthcare outcomes based on accuracy results alone. Accuracy results obtained from test datasets split from an original dataset do not represent external validation and may only show technical feasibility at best [13,25,26,34,35]. High-accuracy results from external datasets in a case-control design may further support technical/analytical validity, but they are still not sufficient to prove clinical validity [25,36]. High-accuracy results from external datasets collected in a diagnostic cohort design without strong selection biases can support clinical validity more strongly [25,26,33]. However, such high-accuracy results cannot directly determine the impact of AI on healthcare and clinical utility [1,33,47]. One would need clinical trials focusing on health outcomes or observational research studies with appropriate analytical methods to account for confounders, preferably in the form of prospective design, to address the impact of AI on healthcare and clinical utility [1,33,48–53].

## Additional Transparency by Sharing Algorithms and Data

Addressing the issues mentioned above would help to enhance the transparency of research studies on AI. However, the effects would be indirect. By contrast, sharing AI algorithms and data from a research study with other researchers or practitioners so they can independently validate the algorithms and compare them to similar algorithms is a more direct means of ensuring the reproducibility and generalizability of AI algorithms for greater transparency. Lack of sharing appears to be an important reason why innovative medical software solutions with clinical potential in most software research, including AI research, have largely been discarded and failed in the transition from academic use cases to widely applicable clinical tools [24,54].

Based on this phenomenon, one prominent medical journal in the field of AI in medicine has recently adopted a policy to strongly encourage making the computer algorithms reported in the journal available to other researchers [24]. Additionally, a body of researchers has recently published the FAIR Guiding Principles for scientific data management and stewardship to provide guidelines to improve the findability, accessibility, interoperability, and reuse of digital assets [55]. Scientific editing and peer review can facilitate such movements by embracing them. However, the proprietary nature of AI algorithms, as well as data protection and ownership, are issues that must be resolved carefully.

## Conclusion

Healthcare is a field in which the implementation of AI involves multiple ethical challenges. AI in healthcare is unlikely to earn trust from patients and healthcare professionals without addressing these ethical issues adequately. Transparency is one of the key ethical issues surrounding AI in healthcare. A list of specific questions to ask to make studies evaluating the performance of AI algorithms more ethically transparent is provided in Table 2. Note that Table 2 is not a comprehensive checklist for reporting research studies on AI in healthcare. Further information and relevant checklists can be found elsewhere [56] and should also be referred to appropriately. The scientific editing and peer review processes of medical journals are well positioned to ensure that studies of AI in healthcare are held to a high standard regarding transparency, thereby facilitating the ethical conduct of research studies and spread of knowledge.

## Conflict of Interest

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

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**Table 2.** Questions to ask to improve ethical transparency in studies evaluating the performance of artificial intelligence algorithms

Question to ask
Regarding training data
Do the authors thoroughly explain how they collected, processed, and organized the data?
Do the authors thoroughly describe the characteristics of the data/patients including demographic characteristics, clinical characteristics, and technical characteristics?
Do the authors explicitly disclose anticipated biases in the data as well as unintended consequences and pitfalls that could result from the biases?
Regarding test data and results
In addition to the above questions, the following questions should also be asked.
Do the authors clearly state if the test data were collected prospectively or retrospectively?
Do the authors clearly state whether the test data were a subsample of the initial dataset from which the training data were also drawn or independent external data?
For external data, do the authors clearly state whether the test data represent a convenience series or a clinical cohort?
For a clinical cohort, do the authors clearly explain patient eligibility criteria and which specific clinical settings they represent?
If test datasets from multiple institutions were used, do the authors report results from each individual institution?
Do the authors clarify (by providing the name of the registry and a study identifier) if they prospectively registered the study in a publicly accessible registry?
Regarding interpretation of study results
Do the authors interpret the results explicitly and avoid over-interpretation?
Regarding sharing of algorithms and data
Do the authors explain how to access their algorithms and data in the report (e.g., placing a link to a web page for download) if they are willing to share them?
For shared data, do the authors explain how they have ensured patient privacy and data protection?

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# Frequently covered diseases in North Korean internal medicine journal *Internal Medicine* [Naegwa]—Secondary publication

Shin Ha<sup>1</sup>, Yo Han Lee<sup>2</sup>

<sup>1</sup>The Office of Medical Research and Academic Affairs, Korea University Medical Center, Seoul; <sup>2</sup>Department of Preventive Medicine, Konyang University College of Medicine, Daejeon, Korea

### Abstract

**Purpose:** This study aimed to investigate the distribution of research fields and diseases in the North Korean internal medicine journal by using a content analysis and a frequency analysis method.

**Methods:** All 2,092 articles published in *Internal Medicine* [Naegwa], a North Korean medical journal, from the first issue of 2006 to the last of 2015, were searched and classified by subspecialty of internal medicines, diseases, and classification codes of the Korean Standard Classification of Diseases version 6.

**Results:** In total, 1,392 out of the 2,092 articles were classified into the internal medicine field, with the remaining 700 classified as basic medicine, family medicine, or anesthesiology. Among the articles on internal medicine, most concerned the digestive system, followed by circulatory, respiratory, renal, and endocrine systems. Among the 700 articles in other fields, articles on gynecology were most common. According to the analysis of diseases, the most commonly studied in internal medicine were gastrointestinal diseases, hypertension, respiratory infectious diseases, glomerular diseases, and diabetes. Meanwhile, cerebrovascular diseases, herpes zoster, mental and behavioral disorders, and urinary tumors were most covered in the other fields. In the distribution by classification code of the Korean Standard Classification of Diseases version 6, circulatory and digestive diseases accounted for 42.4% of articles.

**Conclusion:** The results of this study are expected to be exploited to estimate the disease distribution and disease burden in North Korea.

### Keywords

Classification of diseases; Democratic People's Republic of Korea; Internal medicine; Journal publishing

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**Correspondence to** Yo Han Lee  
vionic@hanmail.net

**ORCID**  
Shin Ha  
<https://orcid.org/0000-0002-1454-731X>  
Yo Han Lee  
<https://orcid.org/0000-0002-9631-9969>

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## Introduction

Despite some groups and researchers being allowed to contact or enter North Korea, it is difficult to study on North Korea [1,2]. The political and historical consequences of the South-North separation after 1945 and subsequent conflicts add to the difficulties of South Korean researchers seeking to access information on North Korea. In spite of those difficulties, research on North Korea is conducted steadily and actively in fields such as politics, economics, and sociology. However, even in those academic fields, it is still difficult to communicate with North Korean researchers or to acquire North Korean academic publications [3]. In the field of medical science, research has been mainly conducted through subjects accessible in South Korea due to the aforementioned limited access. The subjects of the studies were based on the official publications on North Korea by the South Korean government, sources available in interviews conducted with the North Korean refugees, or reports published by the organizations, such as World Health Organization (WHO), that have limited access to North Korea. The topics of the studies were mainly institutional contents such as health systems, health care systems, and medical education status [4-6]. Although there have been some studies on North Korean medical journals, there has been limited examination of the distribution of diseases, quality of medical care, and technology [3,7-10].

North Korea's important medical and public health problems are known to be infectious diseases, maternal health, nutritional problems, and health care systems. However, according to the Korea Foundation for International Healthcare [11], the non-infectious disease burden is also significant. WHO data points out that cardiovascular diseases were the major causes of death in North Korea. In addition, non-infectious diseases accounted for 65% of all deaths. According to a previous study analyzing the disease burden in North Korea, the burden of non-infectious diseases is also problematic [12]. According to the Korea Foundation for International Health Care [11], the present medical health situation in North Korea will be a serious problem if the North and South are unified. Therefore, it is necessary to know the prevalence of diseases in North Korea to grasp the actual condition of North Korea's health and medical situation.

According to Shin et al. [13] and the Korea Foundation for International Healthcare [11], there are 10 North Korean medical journals available in South Korea: *Goryeo Medicine* (North Korea traditional medicine), *Oral Medicine Ophthalmology Otorhinolaryngology*, *Basic Medicine*, *Internal Medicine*, *Pediatrics Obstetrics & Gynecology*, *Preventive Medicine*, *Chosun Pharmacy*, and *Chosun Medicine*. There are two government-owned publishing houses of journals. They have

been consecutively published since their respective first issuances. Given that the journals have been steadily published and there has been no significant change in the numbers of articles published, even during the economic recession of the country, the North Korean medical journals have been accumulating a valuable set of data on the medical concerns of, and results of the studies on, the local population. However, according to Kim and Lee [14], the North Korean government has been involved with the selection of researchers to contribute to the journals as well as their submissions. Therefore, North Korean medical journals have limited openness depending on the intentions of the government.

North Korea has not published epidemiological indicators either internally or externally. In addition, as mentioned earlier, South Korean researchers are not allowed to conduct direct studies on the North Korean people. However, North Korean medical journals, which are an accumulation of research results, are accessible from South Korea. Here, the importance and usefulness of the North Korean medical journals as subjects for objective understanding of the health care situation of North Korea have to be highlighted. Despite the fundamental limitations of research on North Korea, this study focuses on *Internal Medicine* [Naeggwa], a North Korean medical journal, which has the least political value among the other journals. The purpose of this study was to examine the contents of the articles published in *Internal Medicine*.

## Methods

### Ethics statement

This study is based on literature analysis; therefore, informed consent or approval by an institutional review board is not required.

### Material

The data source for this study was 2,092 articles published in the journal *Internal Medicine* from the first issue of 2006 to the third of 2015, obtained from the Information Center on North Korea (<https://unibook.unikorea.go.kr>). This accounts for 9% of the estimated 19,000 articles published in North Korean medical journals accessible in South Korea during the same period. Until February 2016, when the results of this study became available, a total of 9 North Korean medical journals had been available in South Korea, with *Internal Medicine* being the only one on the topic of internal medicine.

### Content and frequency analysis

For this study, two authors majoring in medicine and health sciences read the same articles thoroughly, extracted core and other information from each article, and exported their work

to spreadsheet file. The inputted data was confirmed by two authors as the final data for the study after cross-examinations. The core information includes three items: subspecialty of internal medicine, diseases, and the Korean Standard Classification of Diseases version 6 (KCD-6). Subspecialties were split into nine categories: infection, endocrinology, rheumatology, gastroenterology, cardiology, nephrology, allergy, hematology, and pulmonology. Articles not falling under these subspecialties are classified into the other fields. The articles related to the other fields cover 19 areas: family medicine, basic medicine, anesthesiology, urology, obstetrics and gynecology, pediatrics, neuroscience, neurosurgery, radiology, surgery, emergency medicine, otolaryngology, rehabilitation medicine, mental science, orthopedics, laboratory medicine, dentistry, dermatology, and “editorials, columns, and liberal arts.” The classifications of the articles in endocrinology, gastroenterology, cardiology, and pulmonology among the internal medicine categories were reviewed by clinicians currently working in South Korean university hospitals.

After reading the articles, we extracted the disease name from the titles. When two or more disease names were extracted, each author selected the name that was considered most appropriate after re-reading the article, and the representative disease name selected through agreement between the authors. The disease names were somewhat different from those used in South Korea; therefore, they were replaced with medical terminology consistent with South Korea’s disease names through a similar-term reunification process. For example, the North Korean term “rheumatoid” was replaced with “rheumatism,” “metopodynia” with “headache,” and “pe-gijong” (i.e., emphysema) with “pyegijong.” However, if a term could not be replaced by a South Korean version, the words and terms used in North Korea were used. In the endocrine, digestive, circulatory, and respiratory categories, higher classification items including disease names were added to confirm the distribution, based on the requests and advice of the faculty members who participated in the classification process. The endocrinology category included thyroid disorders, thyroid nodule, osteoporosis, diabetes, and autoimmune thyroid disease and tumor. The gastroenterology category included liver, biliary tract, peritoneum, gastrointestinal tract, intestine, and pancreas disorders. The cardiology category included hyperlipidemia, hypertension, other circulatory system disorders, other forms of heart disease, cerebrovascular disease, arterial and capillary disease, chronic rheumatic heart disease, congenital malformations, deformations and chromosomal abnormalities, circulatory disease, pulmonary heart disease, diseases of pulmonary circulation, and ischemic heart disease. The pulmonology category covered chronic obstructive respiratory diseases, respiratory system infections, tumor, and

asthma. The KCD-6 major classification codes were intended to match the names of the major diseases covered by the authors or to find the appropriate codes and ascribe the highest-level code element. For example, if the disease name was facial nerve disorders, the code G51 (corresponding to the disease name) was searched for, and then the upper-class code G was given.

## Results

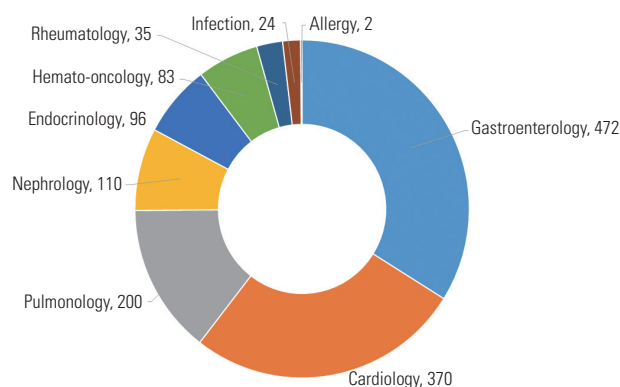
Out of 2,092 articles, 1,392 within nine subspecialties of internal medicine were identified, and 700 within the other areas. The nine sub-specialties of internal medicine ordered by frequency of occurrence are as follows: gastroenterology (472 cases, 33.9%), cardiology (370, 26.6%), pulmonology (200, 14.4%), nephrology (110, 7.9%), endocrinology (96, 6.9%), hematology and oncology (83, 6.0%), rheumatology (35, 2.5%), infection (24, 1.7%), and allergy (2, 0.1%) (Fig. 1).

### Subject distribution of the fields other than internal medicine

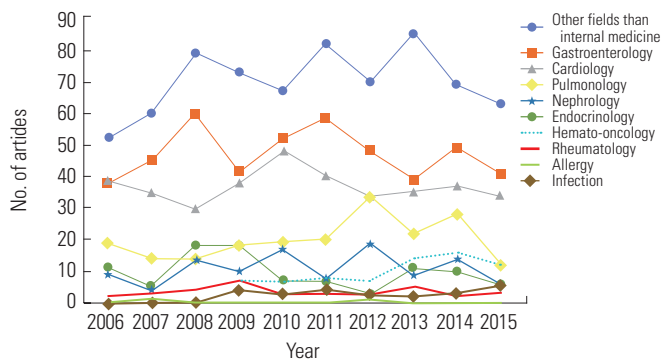
The number of articles related to the other fields was 700, ordered by frequency of occurrence are as follows: neurology (206 cases, 29.4%), basic medicine (188, 26.9%), dermatology (94, 13.4%), neurosurgery (40, 5.7%), psychiatry (34, 4.9%), urology (25, 3.6%), orthopedics (20, 2.9%), emergency medicine (9, 1.3%), and dentistry (1, 0.1%). The 43 remaining articles are the editorials and columns of the North Korean authorities that did not fall within the bounds of medical science.

### Publication trends by subspecialty

Over a decade (2006–2015), the trends in the publication of articles by subspecialty showed that there was no significant increase or decrease in the number of articles published (Fig.



**Fig. 1.** Sub-specialties of 1,392 articles in the field of internal medicine published in *Internal Medicine* [Naegwa] from 2006 to 2015.



**Fig. 2.** Publication trends by internal medicine sub-specialty among the 2,092 articles published in *Internal Medicine* [Naegwa] from 2006 to 2015.

**Table 1.** Major disease in the field of internal medicine that appeared in the North Korean internal medicine journal *Internal Medicine* [Naegwa] from 2006 to 2015

Sub-specialties	Disease name	Value (n=1,248)
Gastroenterology	Gastrointestinal diseases	131 (10.5)
	Liver diseases	88 (7.1)
	Biliary tract disease	57 (4.6)
	Intestine disease	46 (3.7)
	Tumor	46 (3.7)
Cardiology	Hypertension	79 (6.3)
	Ischemic heart disease	79 (6.3)
	Other forms of heart disease	68 (5.4)
	Disease of circulatory system	27 (2.2)
	Hyperlipidemia	24 (1.9)
	Tumor	1 (0.1)
Pulmonology	Respiratory infectious diseases	77 (6.2)
	Chronic obstructive pulmonary disease <sup>a)</sup>	29 (2.3)
	Asthma	22 (1.8)
	Carbon monoxide poisoning	18 (1.4)
	Tumor	18 (1.4)
Nephrology	Glomerular diseases	33 (2.6)
	Urolithiasis	11 (0.9)
	Acute renal failure	6 (0.5)
	Nephrotic syndrome	5 (0.4)
	Tumor	2 (0.2)
Endocrinology	Diabetes	43 (3.4)
	Autoimmune thyroid disease	17 (1.4)
	Thyroid disorders	4 (0.3)
	Tumor	2 (0.2)

Values are presented as number (%).

<sup>a)</sup>Including chronic bronchitis.

2). There were no changes in the issuing institution and issuing dates, and no increases in the frequency of issuance during the period. No significant changes in the number of articles in any particular subject area were observed. There were no remarkable changes in the occupancy of each subspecialty in terms of the number of articles. However, articles on infection had not been published at all before 2009, and two to five cases per year have been published since then. Articles on allergy were found in 2007 and 2012, one for each.

**Status by disease names**

Table 1 shows the status of the major diseases in the top five of the nine internal medicine subspecialties and the top five of the other fields. The diseases are ranked by subspecialty as follows: For gastroenterology, the order is gastroduodenal disease (131 cases, 10.5%), liver diseases (88, 7.1%), biliary diseases (57, 4.6%), and intestine diseases (46, 3.7%). For cardiology, the order is hypertension (79, 6.3%), ischemic heart disease (79, 6.3%), other forms of heart disease (68, 5.4%), circulatory diseases (27, 2.2%), and hyperlipidemia (24, 1.9%). For pulmonology, the order is respiratory infectious diseases (77,

**Table 2.** Major diseases in the areas other than internal medicine that appeared in the North Korean internal medicine journal *Internal Medicine* [Naegwa] from 2006 to 2015

Areas	Disease name	Value (n=700)
Neurology	Cerebrovascular diseases	59 (8.4)
	Cerebral infarction	23 (3.3)
	Neurological diseases	18 (2.6)
	Lumbosacral neuritis or radicular syndrome	16 (2.3)
	Tumor	3 (0.4)
Dermatology	Herpes zoster	15 (2.1)
	Tinea pedis	10 (1.4)
	Psoriasis	9 (1.3)
Neurosurgery	Tumor	4 (0.6)
	Cerebrovascular diseases	13 (1.9)
	Subarachnoid hemorrhage	5 (0.7)
	Tumor	1 (0.1)
Psychiatry	Mental and behavioral disorders	9 (1.3)
	Schizophrenia	4 (0.3)
	Dissociative [conversion] disorders	4 (0.6)
	Nonorganic sleep disorders	3 (0.4)
Urology	Tumor	9 (1.3)
	Prostatitis	3 (0.4)
	Urinary tract infection	3 (0.4)

Values are presented as number (%).

6.2%), chronic obstructive pulmonary disease (29, 2.3%), asthma (22, 1.8%), and carbon monoxide (CO) poisoning (18, 1.4%). For nephrology, the order is glomerular diseases (33, 2.6%), urolithiasis (11, 0.9%), acute renal failure (6, 0.5%), and nephrotic syndrome (5, 0.4%). For endocrinology, the order is diabetes (43, 3.4%), autoimmune thyroid disease (17, 1.4%), and thyroid disorders (4, 0.3%). The main organs or tissues of the cancers in the top five of the nine internal medicine subspecialties are as follows. For the gastroenterology, 16 cases of gastric cancer, 16 cases of liver cancer and eight cases of rectal cancer were studied. There were two cases each on colorectal cancer and mucosa-associated lymphoid tissue lymphoma. One case of pericardial mesothelioma was found in the cardiology area. There were 18 cases of respiratory system tumors, 13 of which are about lung cancer, and one peripheral case and one asymptomatic case. There were two cases of renal tumors, renal cell carcinoma and renal pelvic tumors. For the endocrinology, there were two cases, both thyroid tumors.

For the other category, research subjects are as follows (Table 2). For neurology, the order was neurological diseases (59, 8.4%), cerebral infarction (23, 3.3%), nervous system diseases (18, 2.6%), and lumbosacral neuritis or radicular syndrome (16, 2.3%). For dermatology, the order was herpes zoster (15, 2.1%), tinea pedis (10, 1.4%), and psoriasis (9, 1.3%). For neurosurgery, the order was cerebrovascular diseases (13, 1.9%) and subarachnoid hemorrhage (5, 0.7%). For psychiatry, the order was mental and behavioral disorders (9, 1.3%), schizophrenia (4, 0.6%), dissociative [conversion] disorders (4, 0.6%), and nonorganic sleep disorders (3, 0.4%). For urology, the order was tumor (9, 1.3%), prostatitis (3, 0.4%) and urinary tract infection (3, 0.4%). Five of the nine tumor cases were bladder cancers and four were prostate cancers.

### KCD classification result

Table 3 shows the classification result using the KCD's classification codes. The codes were assigned to 1,743 out of the 2,092 articles; the 349 uncoded articles were the editorials or columns of the North Korean government, introduction of knowledge on general medical science, experimental research not targeting specific diseases, and research and evaluation of specific medical technologies, devices, and software. According to the results of the classification, the main subjects of study were diseases of the circulatory system (396, 22.7%), diseases of the digestive system (344, 19.7%), neoplasms (138, 7.9%), certain infectious or parasitic diseases (126, 7.2%), diseases of the respiratory system (121, 6.9%), endocrine, nutritional or metabolic diseases (111, 6.4%), diseases of the genitourinary system (108, 6.2%), diseases of the musculoskeletal system or connective tissue (84, 4.8%), diseases of the nervous system (77, 4.4%), mental, behavioral or neurodevelopmental

**Table 3.** Number of articles classified according to KCD-6, published in *Internal Medicine* [Naegwa] from 2006 to 2015

Diseases according to KCD-6	Value
Diseases of the circulatory system	396 (22.7)
Diseases of the digestive system	344 (19.7)
Neoplasm	138 (7.9)
Certain infectious or parasitic diseases	126 (7.2)
Diseases of the respiratory system	121 (6.9)
Endocrine, nutritional or metabolic diseases	111 (6.4)
Diseases of the genitourinary system	108 (6.2)
Diseases of the musculoskeletal system or connective tissue	84 (4.8)
Diseases of the nervous system	77 (4.4)
Mental, behavioural or neurodevelopmental disorders	49 (2.8)
Diseases of the skin	49 (2.8)
Diseases of the blood or blood-forming organs	38 (2.2)
Symptoms, signs or clinical findings, not elsewhere classified	33 (1.9)
Injury, poisoning or certain other consequences of external causes	30 (1.7)
External causes of morbidity or mortality	21 (1.2)
Developmental anomalies	11 (0.6)
Codes for special purposes	4 (0.2)
Diseases of the visual system	2 (0.1)
Diseases of the ear or mastoid process	1 (0.1)
Total	1,743 (100)

Values are presented as number of articles (%).

KCD-6, Korean Standard Classification of Diseases version 6.

disorders (49, 2.8%), diseases of the skin (49, 2.8%), and diseases of the blood or blood-forming organs (38, 2.2%).

### Discussion

Through this study, we were able to determine which diseases are mainly covered in *Internal Medicine*, a medical journal in North Korea, and what kinds of diseases have been studied in the field of medicine. The main results revealed in this study can be used to estimate the current state of medical diseases in North Korea. The topics of gastroenterology, cardiology, and pulmonology were the highest. The number of articles in these three subspecialties, 1,042, accounted for 74.9% of the total 1,392 in the field of internal medicine. According to the KCD-6 classifications, the combined 861 cases of circulatory diseases, digestive diseases, and respiratory diseases were the most common. The neoplasms (138, 7.9%) were classified separately; however, the results of the KCD-6 classification are

not significantly different from the distribution results by subspecialty, considering that neoplasms are included as a disease name. It can be assumed that digestive diseases, circulatory diseases, and respiratory diseases cause a relatively high disease burden in North Korea, as confirmed by the WHO data [11]. Out of gastrointestinal cancers, the numbers of liver cancer and stomach cancer cases were high, at 16 each, whereas there were only two colorectal cancer cases. That is probably because North Koreans' eating habits are not the same as the western meat-based diets [15,16].

Cerebrovascular diseases, heart diseases, liver diseases, hypertension, and diabetes, are relatively common diseases in North Korea and it is estimated that the related disease burden is heavy (Table 1). These diseases require continuous medication and lifestyle correction for the management of diseases, which is difficult taking into consideration the economic and health situation of North Korea after a series of hardships [17,18].

It is difficult to determine the degree of a disease on the basis of the high frequency of studies on the specific disease in *Internal Medicine*. However, it is possible to estimate to some extent by supplementing several grounds, including the overall socio-economic situation of North Korea. For example, regarding the respiratory system, CO poisoning was the fourth most common subject (Table 1). It is not reasonable to judge that CO poisoning is widespread in North Korea, causing social loss, based on the above results. However, although it is difficult to judge the degree of the disease, it can be deduced that the socioeconomic situation of North Korea provides an environment in which North Korean medical researchers can continue to be interested in CO poisoning, and it can be assumed that the environmental impact is reflected in the number of articles dealing with the disease. This is because the socioeconomic situation of North Korea serves as a basis for assuming that North Koreans are more easily exposed to CO poisoning. According to Kim et al. [19], in North Korea the demand for fuel briquettes is very high because of the relatively cold winter, continuous need for heating, the chronic economic difficulties and power shortages. In this aspect, it can be expected that North Koreans, including medical researchers, are more exposed to CO poisoning.

*Internal Medicine* is a journal that deals with a specific subject area, but it has the characteristic that it covers the whole field of medicine. It also includes surgical subjects such as subarachnoid hemorrhage, as well as dermatological and psychiatric ones. This can be considered from two perspectives. First, when the results were of collaborative research conducted by a number of subspecialties such as interdisciplinary research, the author chose to submit the article to *Internal Medicine*. Second, because there were no academic journals dedi-

cated to topics such as neurology, journals such as *Internal Medicine* or their editors accepted articles in other fields. It is difficult to explicate why *Internal Medicine* reflects various medical topics only by these perspectives. However, it is likely that a hypothesis can be presented based on information such as the possibility of collaborative research by specialized fields, restricted number of medical journals in North Korea, and control of the North Korean government. This hypothesis can be verified through qualitative research including interviews with or questionnaires completed by North Korean refugees who had contributed to the North Korean medical journals.

*Internal Medicine* is believed to function as a space for independent academic exchange and sharing as a medical journal. Inside *Internal Medicine*, there is no instructions to authors such as submission guidelines, style and forms, or editorial policy. However, articles on the subjects of internal medicine have been continuously published through *Internal Medicine* (Fig. 2). In addition, there are few quantitative changes in the publication cycle and the articles covered. It is presumed that the information related to the contribution is communicated to the researchers through the North Korean authorities or that the North Korean medical researchers are aware of it in advance. In addition, there are no foreigners among the researchers who contributed to *Internal Medicine*. This suggests that *Internal Medicine* restricts the contributions to North Korean medical researchers living in North Korea. It is unique to North Korea to share research results in limited areas among a limited set of researchers. North Korea has few international exchanges, and academia is no exception. In the absence of exchange with the world, *Internal Medicine* seems to have continued its function by continuously publishing the articles of North Korean researchers.

The most important point in classifying the diseases covered by the articles in *Internal Medicine* was to apply an objective classification system and to make it sufficiently reproducible by other researchers in future. For the classification codes, KCD-6 was applied, which was made considering the characteristics of South Korea and meets the international standards. We also considered using International Statistical Classification of Diseases and Related Health Problems 10th revision (ICD-10), but decided that it was appropriate to use the KCD-6 to understand the structure of the code and reduce the amount of time it takes to identify the content on the diseases that corresponds to individual codes, given that the South and North use a single language. Moreover, we thought that KCD-6 was not significantly different from ICD-10, and since we would check only the differences if it were necessary to change to ICD-10, it would be appropriate for a limited research period. During the study, KCD-6 was revised to the next version, KCD-7, but at the time of revision, this paper

was already in the result analysis phase, which made us unable to reflect the revision. This should be redressed when similar studies are conducted in the future. It is better to consider using a recent version of ICD rather than KCD when conducting comparative reviews with international studies.

Studies on North Korea, including this article are accompanied by a qualitative approach in interpreting the results, and therefore much effort is required. This is because we have difficulty in maintaining objectivity for research subjects due to preconceptions, as well as lack of prior knowledge and objective information about them [20].

In conclusion, it was possible to understand the topics of North Korean internal medicine journal *Internal Medicine* by searching all articles published from 2006 to 2015. Major topics were gastroenterology, cardiology, pulmonology, nephrology, and endocrinology. The results of this study are expected to be exploited to estimate the disease distribution and disease burden in North Korea.

### Conflict of Interest

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

### Data Availability

Please contact corresponding author, Dr. Yo Han Lee to access the raw data of article.

### Supplementary Material

Supplementary file is available from the Harvard Dataverse at: <https://doi.org/10.7910/DVN/5OATIR>.

**Suppl. 1.** Files generated for analysis of data.

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# Korean medical students' knowledge about and attitudes towards plagiarism according to their commission of plagiarism

Man Sup Lim<sup>1</sup>, Sun Huh<sup>2</sup>

<sup>1</sup>Department of Medical Education, <sup>2</sup>Department of Parasitology and Institute of Medical Education, College of Medicine, Hallym University, Chuncheon, Korea

### Abstract

**Purpose:** This study investigated Korean medical students' knowledge about and attitudes towards plagiarism according to their commission of plagiarism. Furthermore, the institutional environment regarding plagiarism was assessed.

**Methods:** A questionnaire provided by Turnitin was distributed to 67 first-year medical students of Hallym University, Korea in December 17, 2015 through SurveyMonkey, a web survey platform. Of the 67 subjects, responses from 60 students (89.6%) were analyzed with descriptive statistics and a comparative analysis.

**Results:** The respondents' average knowledge level about plagiarism, measured as the item difficulty index for the relevant 8 items, was 0.658 (maximum 1). More than half did not know where they could find guidance about how to reference others' work. They were only a little confident (41.7%) or not confident (11.7%) in referencing others' work. They felt that plagiarism was not dealt with seriously at the university (53.3%). Eighty percent of students wanted their instructors to use text-matching software to check students' work, and many of them thought that text-matching software helps them to spend more time making sure that references are correct (48.3%). Forty-six (75.4%) students reported having copied and pasted from the internet for their work without citing the original work. There were no significant differences in knowledge about plagiarism, attitudes towards classmates who plagiarize, or recommended actions against classmates who plagiarize according to whether students had committed plagiarism.

**Conclusion:** The medical students' knowledge about plagiarism was insufficient. This medical school should introduce more intensive training on how to correctly reference others' work and on the concept of plagiarism.

### Keywords

Medical students; Republic of Korea; Plagiarism; Surveys and questionnaires

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**Correspondence to** Sun Huh

shuh@hallym.ac.kr

### ORCID

Man Sup Lim

<https://orcid.org/0000-0001-9222-2740>

Sun Huh

<https://orcid.org/0000-0002-8559-8640>



## Introduction

Plagiarism can be defined as “the appropriation of another person’s ideas, processes, results, or words without giving appropriate credit” according to the Office of Research Integrity in the United States Department of Health and Human Services [1]. The same definition is provided in Korea in the Ministry of Education’s guideline on research ethics [2]. However, it is difficult to define to what extent anyone’s opinion or writing reflects his or her own ideas. Frequently, thought and writing present an individual’s interpretation and summary of external sources, such as books, journals, mass media, and ideas verbally expressed by others, including family members and acquaintances. It is impossible for everybody to think or write without drawing upon outside information. Although it is difficult to produce original ideas, it is possible for a person to articulate his or her own thoughts or knowledge in written form without copying others’ work. To do so, it is important to write one’s own thoughts after interpreting previous work. Paraphrasing using one’s own logic is also required. If it is necessary to cite another person’s work in its original wording, the quoted text should be clearly indicated (e.g., using quotation marks), and the original work should be appropriately cited.

The major types of research misconduct include fabrication, falsification, and plagiarism. Therefore, it is necessary to avoid plagiarism in scientific writing. For this reason, appropriate writing is taught at the university level. Korean medical students are expected to write an article during their training period in hospitals as residents, because it is mandatory for them to publish or submit articles to medical journals to be eligible to take specialty-specific board examinations. Some medical students will become researchers or professors at university hospitals or research institutes in the future, in which case, they would write articles as part of their routine work.

This study investigated Korean medical students’ knowledge about and attitudes towards plagiarism according to their commission of plagiarism. Furthermore, the institutional environment regarding plagiarism was examined. The results will provide support for the university’s policy on scientific writing classes and will help promote the prevention of plagiarism by graduates of medical schools in Korea.

The null hypotheses of this study were as follows: first, medical students’ knowledge about plagiarism would not differ depending on whether they had committed plagiarism; second, medical students’ attitudes towards plagiarism would not differ according to whether they had committed plagiarism; and third, medical students’ recommended actions against plagiarism would not differ according to whether they had committed plagiarism.

## Methods

**Ethics statement:** Informed consent was obtained from subjects as part of the first page of the survey. They were able to quit the web survey at any time during the survey process without any restrictions.

**Study design:** This was an observational study using a known survey tool.

**Setting/participants:** Sixty-seven first-year medical students in Hallym University in 2015 were invited to complete the survey. The survey was conducted in December 17, 2015. The survey tool was a questionnaire used for surveys on plagiarism by Turnitin. It was dispatched to the students through SurveyMonkey, a web survey platform. The content of the survey is presented in Suppl. 1. Of the 67 students, 60 (89.6%) responded to the survey.

**Validity and reliability of the survey tool:** This tool had already been developed and used by Turnitin; therefore, no further validity testing was done. The survey tool consisted of 26 items, which are listed in Suppl. 1. The first three items gathered demographic information on the subjects. Eight items measured knowledge about plagiarism. Five items assessed the university environment regarding plagiarism. The number of items on attitudes towards plagiarism was five. Four items assessed subjects’ commission of plagiarism. The final item solicited further opinions on plagiarism. The reliability test showed that the Cronbach  $\alpha$  value was 0.8487 for 17 survey items. Some items were excluded from the reliability test because they did not have nominal or binomial scale options, had responses from only some subjects, or gathered information on subjects’ past commission of plagiarism. The items included in the reliability test are listed in Suppl. 2.

**Variables:** The variables measured were knowledge about plagiarism, attitudes towards plagiarism, recommended actions against plagiarism, and commission of plagiarism.

**Data sources/measurement:** The sources were response data from 60 medical students collected from the survey. The measurement methods were descriptive statistics and a comparative analysis of knowledge about and attitudes towards plagiarism between students who had committed plagiarism and those who had not committed plagiarism.

**Bias:** There was no noteworthy source of bias during data collection and analysis.

**Study size:** If the t-test was done to compare mean values between 2 independent groups, an adequate sample size was estimated as 66 with the following input parameters: effect size (D), 0.7;  $\alpha$  error probability, 0.05; power (1- $\beta$  probability), 0.75; and allocation ratio (N2/N1), 2 [3].

**Quantitative variables:** There were no quantitative variables. All variables were qualitative.

**Statistical methods:** The results were analyzed with DBSTAT ver. 5.0 (DBSTAT Co., Chuncheon, Korea) for descriptive and comparative analyses.

## Results

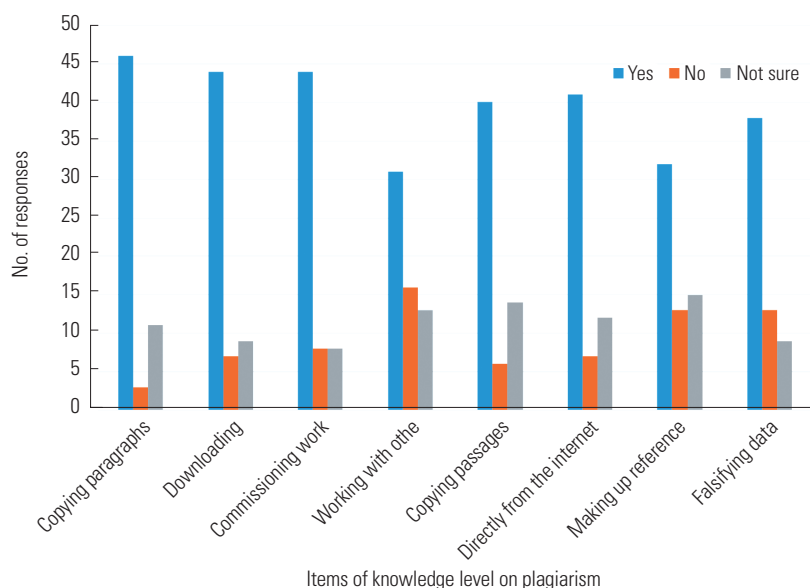
All response data are available in Dataset 1.

**Average knowledge about plagiarism:** The results for these 8 items are presented in Fig. 1. The item difficulty index for knowledge about plagiarism was 0.658. Replies of “not sure” were counted as a wrong answer, equivalent to “no.”

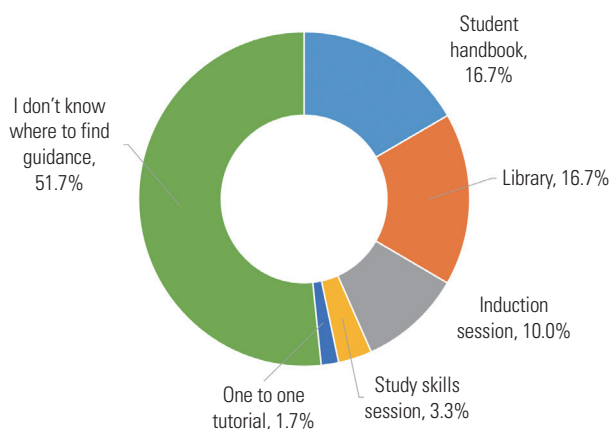
**Environment regarding plagiarism:** More than half of the respondents did not know where they could find guidance about how to reference others’ work (Fig. 2). Thirty-two stu-

dents (54.2%) said that university guidelines explained how to cite others’ work; while 27 students said that they did not (45.8%). More than half of the students (53.3%) felt that plagiarism was not dealt with seriously at the university. Twenty-five students (41.7%) said that teachers check whether students appropriately cite others’ work. Sixteen students (26.7%) said that teachers always spot unoriginal materials.

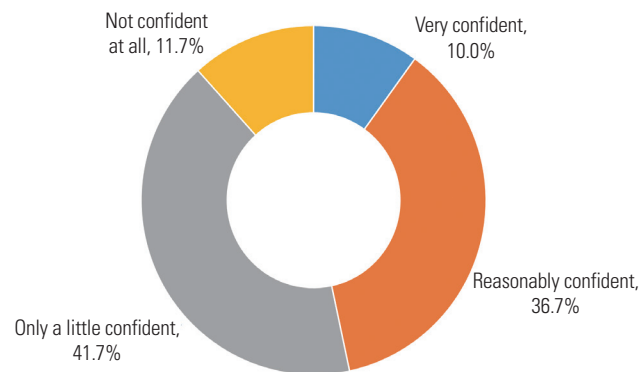
**Attitudes towards plagiarism:** Students were only a little confident (41.7%) or not confident (11.7%) in referencing others’ work (Fig. 3). Forty-eight students (80.0%) wanted their teachers to use text-matching software to check students’ work. Twenty-nine students thought that text-matching software helps them to spend more time making sure that references are correct (48.3%). Many students felt that by copying



**Fig. 1.** Knowledge about plagiarism among 60 medical students at Hallym University, Korea, who responded on December 17, 2015.



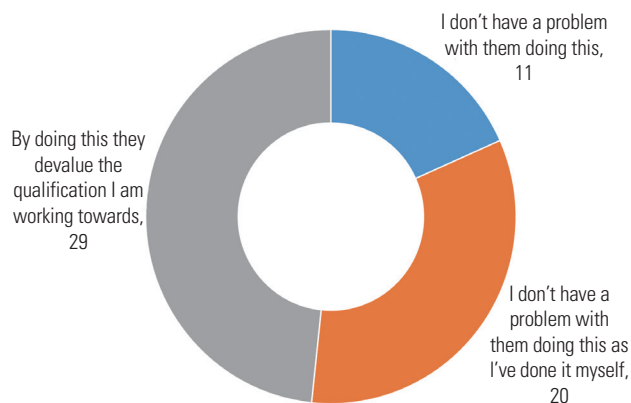
**Fig. 2.** Where 60 medical students at Hallym University found guidance for citing others’ work.



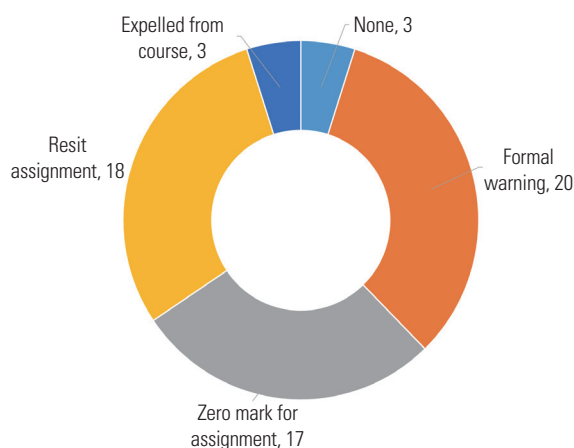
**Fig. 3.** Medical students’ confidence in citing others’ work.

and pasting materials from the internet or using a writing service, their classmates would devalue their qualification (48.3%) (Fig. 4). Medical students' recommended actions against classmates who plagiarize others' work are presented in Fig. 5, with options including a formal warning, a mark of zero for the assignment, having to resit the assignment, having to resit the module, and being expelled from the course.

**Commission of plagiarism:** Forty-six (76.7%) students reported having copied and pasted from the internet for their work without citing the original work. The responses on the degree of plagiarism were as follows: a few words, 4; a few sentences, 27; and a paragraph or more, 17. No responses were present for the item, "all of my assignment was copied from the internet." Two students who reported not having committed plagiarism responded to the item on the degree of plagiarism. Since this pattern of responses is logically inconsistent, their responses were not considered when tabulating students' com-



**Fig. 4.** Attitudes of 60 medical students about students who copy and paste material from the internet or who use essay-writing services and then submit this work as their own.



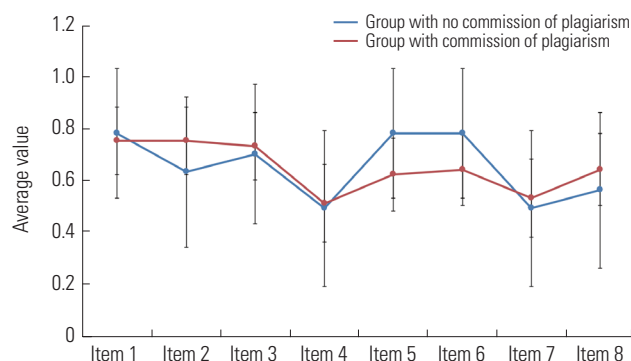
**Fig. 5.** Medical students' recommended actions against classmates who plagiarize others' work.

mission of plagiarism. Twelve students (20.3%) reported having used essay-writing services to submit their homework. Fifty-four students (90.0%) knew classmates who had copied and pasted materials from the internet or used a writing service.

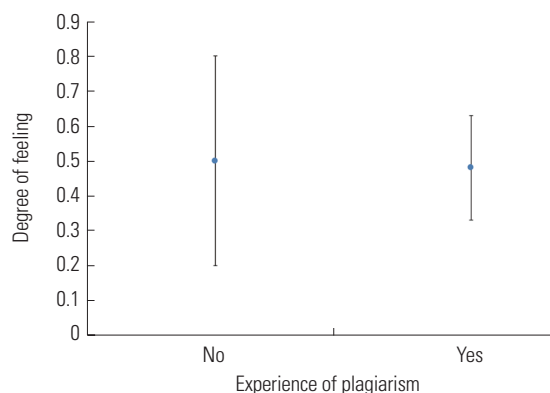
**Comparison of knowledge about plagiarism according to commission of plagiarism:** There was no significant difference in knowledge about plagiarism according to whether students had committed plagiarism, as determined through 2-way repeated-measures analysis of variance (significance level  $\alpha=0.05$ ,  $F=4.01$ ,  $P=0.9775$ ) (Fig. 6).

**Comparison of attitudes towards classmates who plagiarized others' work:** There was no significant difference in attitudes between students who had plagiarized and those who had not (chi-square test,  $P=0.8786$ ) (Fig. 7). The Student t-test could not be used because the sample did not show a normal distribution. Two options ("I don't have a problem with them doing this" and "I don't have a problem with them doing this as I've done it myself") were treated as no. The option "By doing this they devalue the qualification I am working towards" was treated as yes.

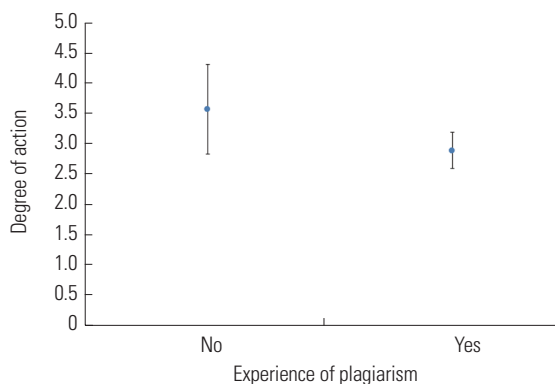
**Comparison of recommended actions against classmates who**



**Fig. 6.** Comparison of knowledge about plagiarism on the relevant 8 items according to commission of plagiarism. Bar=standard deviation.



**Fig. 7.** Medical students' attitudes towards classmates who plagiarize others' work.



**Fig. 8.** Degree of medical students' recommended actions against classmates who plagiarize others' work.

**plagiarize others' work:** The options for actions that should be taken against students who plagiarize were transformed to a nominal scale in order of increasing severity, as follows: none, 1; formal warning, 2; a mark of zero for the assignment, 3; having to resit the assignment, 4; having to resit the module, 5; being expelled from the course, 6; and a fine, 7 (Fig. 8). The Mann-Whitney U-test was used because the samples did not show a normal distribution. No significant difference was found in the strength of recommended actions between students depending on whether they had committed plagiarism ( $P = 0.0823$ ).

## Discussion

**Key results:** The knowledge of medical students about plagiarism was insufficient. The mean item difficulty index (score) of the 8 relevant items was 0.658. There was no significant difference in knowledge level according to plagiarism commission. Medical students' environment regarding plagiarism was also inadequate. Forty-six (76.7%) students had committed plagiarism. There was no significant difference in attitudes towards classmates who plagiarize others' work based on commission of plagiarism. Likewise, no significant difference was found in the strength of recommended actions against classmates who plagiarize according to whether students had committed plagiarism.

**Interpretation and suggestions:** The first null hypothesis ("medical students' knowledge about plagiarism would not differ depending on whether they had committed plagiarism") was accepted. The second null hypothesis ("medical students' attitudes about plagiarism would not differ according to whether they had committed plagiarism") was also accepted. Finally, the third null hypothesis ("medical students' recommended actions against plagiarism would not differ according to whether they had committed plagiarism") was accepted.

The lack of differences in some variables according to students' commission of plagiarism may have originated from the fact that their level of knowledge about plagiarism was not adequate. If someone does not know what the best practice is, it is difficult to urge him or her to carry out that best practice. Additionally, a merit of this study is that it utilized the survey questionnaire on plagiarism provided by Turnitin. Therefore, it was possible to analyze the general situation regarding plagiarism at a medical school in Korea.

What can be suggested based on the above results? Hallym University has introduced the use of plagiarism detection programs such as Turnitin or CopyKiller (<https://www.copykiller.com/>), the latter of which is a Korea-based plagiarism detection program, to help students and teachers to prevent plagiarism. Therefore, those programs should be introduced to students more emphatically. If students understand the merits of those programs, they will be able to prevent plagiarism more efficiently. The institutional environment also should be improved so that students understand and practice good writing. Teachers should use plagiarism-detecting programs more actively to help students' writing. More thorough training should be given on appropriate citation of others' work and performing one's own interpretation of data.

**Comparison with previous relevant studies:** In literature databases including PubMed, KoreaMed, Web of Science Core Collection, Scopus, and Google Scholar, when using the search term (plagiarism AND "medical students"), studies on plagiarism among medical students in Korea are rare. Only 1 report on plagiarism during a problem-based learning course in medical school in Korea was published. During that course, 62% of students copied and pasted from websites; furthermore, they were not aware that plagiarism is a serious problem [4]. Recent reports on medical students' plagiarism outside of Korea can be summarized as follows. In a medical school in Malaysia, 257 of 464 students (55.4%) responded that they copied assignment from other students [5]; in 2 medical colleges in Pakistan, of 1,100 participants, 783 students (71.18%) said that they used others' work without citation [6]; and in Iraq, out of 280 medical students, 165 (58.9%) practiced plagiarism [7]. The above data on plagiarism are comparable to the results of this study, in which 46 of 60 students (76.7%) reported having committed plagiarism.

**Limitations:** This was a single institution-based study with a relatively small number of subjects, making it difficult to generalize the results and interpretation to other medical students outside of Hallym University. Due to the lack of a normal distribution, it was not possible to conduct a parametric analysis, except for knowledge level according to plagiarism commission.

**Generalizability:** As mentioned as a limitation of this study, one should be cautious about generalizing these results to other

medical schools in Korea and abroad. To obtain a more comprehensive assessment of the status of plagiarism among Korean medical students, multi-center studies are recommended with the same survey tool. It is also recommended that medical schools outside of Korea should adopt this tool. Another merit of this study is that it furnishes further confirmation of the reliability of the survey questionnaire on plagiarism provided by Turnitin. Therefore, this survey tool may be able to be used in other settings with more confidence. This tool can be introduced in all universities throughout the world, regardless of whether it is applied to undergraduates or graduates.

**Conclusion:** In this study, medical students' knowledge about plagiarism, environment regarding plagiarism, commission of plagiarism, attitudes towards plagiarism, and recommended actions against plagiarism were evaluated. No significant differences were found in knowledge, attitudes, and recommended actions against plagiarism between students who had committed plagiarism and those who had not. Although these results are from a single institution, Korean medical schools should present a clearer introduction describing how to correctly reference others' work and the concept of plagiarism. Students should be able to use plagiarism detection programs provided by the University Library, such as Turnitin or CopyKiller, without difficulty to prevent plagiarism in their writing.

### Conflict of Interest

The survey tool was obtained from Turnitin with generous permission; however, there was no financial support from Turnitin. Staff members of Turnitin were not involved in any processes of the survey, the analysis of data, or the interpretation. Turnitin and Copy Killer were mentioned not for propagation of the commercial products, but for educational purposes. Otherwise, no potential conflict of interest relevant to this article was reported.

### Data Availability

Dataset is available from the Harvard Dataverse at: <https://doi.org/10.7910/DVN/419NYZ>.

**Dataset 1.** Response data of medical students at Hallym University to the survey questionnaire on plagiarism provided by Turnitin.

### Supplementary Material

Supplementary files are available from Harvard Dataverse at: <https://doi.org/10.7910/DVN/419NYZ>.

**Suppl. 1.** Survey questionnaire on plagiarism provided by Turnitin.

**Suppl. 2.** Results of the reliability test and items included from the survey questionnaire on plagiarism provided by Turnitin.

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# Compliance of “Principles of transparency and best practice in scholarly publishing” in academic society published journals

Hyung Wook Choi<sup>1</sup>, Ye Jin Choi<sup>1</sup>, Soon Kim<sup>2</sup>

<sup>1</sup>Department of Library and Information Science, <sup>2</sup>Research Institute for Social Science, Ewha Womans University, Seoul, Korea

### Abstract

**Purpose:** Four international associations, including the Open Access Scholarly Publishers Association, the Directory of Open Access Journals, the Committee on Publication Ethics, and the World Association of Medical Editors declared the third version of “Principles of transparency and best practice in scholarly publishing” to ensure transparency and quality in journal publications. This study is aimed at assessing the guidelines from the journals’ websites manually.

**Methods:** In this study, three researchers investigate the homepages of 781 academic society-published journals that are registered in the Science Citation Index Expanded and whether these journals are effectively adopting these new guidelines. In this paper, 33 items from the guidelines are examined. The 33 items are rearranged into four different categories: basic journal information; publication ethics; copyright and archiving information; and profit model. The researchers count yes or no after checking the adopting status on the journal homepage and dividing into four scales: 0% to 25% for is rarely practiced, 26% to 50% for is poorly practiced, 51% to 75% for is adequately practiced, and 76% to 100% for is well practiced.

**Results:** Of the 33 items, 10 are found to be poorly or rarely practiced, including readership, data sharing, archiving policies, and profit model information.

**Conclusion:** It could be the most up-to-date indicator of the current status of applying best practice guidelines. Society journal editors especially from Asia should evaluate their journals regarding “Principles of transparency and best practice in scholarly publishing”.

### Keywords

Best practice; Scholarly publishing; Academic society journals; Transparency; Publication ethics

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**Correspondence to** Soon Kim  
soonkim123@ewhain.net

### ORCID

Hyung Wook Choi

<https://orcid.org/0000-0002-4075-0768>

Ye Jin Choi

<https://orcid.org/0000-0002-4155-2093>

Soon Kim

<https://orcid.org/0000-0001-7154-2809>

## Introduction

A high level of trust is essential to ensure publication and sharing of research results. However, the amount of unethical research is increasing, and so-called "predatory" journals have been rapidly appearing over the past decade. Although publishing practices vary by discipline or region, common ethical standards exist to ensure trusted peer-reviewed journals at the highest level. In an attempt to combat the rise of unethical and suspicious journals, the International Association of Scientific, Technical, and Medical Publishers (STM) announced the "STM statement on the increase of unethical and deceptive journal practices." The STM is not only actively supporting both the Committee on Publication Ethics (COPE) and the Think. Check. Submit initiative; it is also strictly applying the Code of Conduct and the policy on "international ethical principles for scholarly publication" to its members [1].

Another four international associations, including the Open Access Scholarly Publishers Association, the Directory of Open Access Journals, the COPE, and the World Association of Medical Editors, declared the third version of the "Principles of transparency and best practice in scholarly publishing," which was first published in 2013 to ensure transparency and quality in journal publications. Although this guideline was announced in January 2018, many journals are still unaware of the Principles, which include transparent journal information on the homepage, editorial boards, peer review, author publication charge, publication ethics, archiving, and accessibility. The four associations are promoting good practices through the 16 Principles, and each uses them in its own way along with other information to assess membership applications. They also require all existing members to comply with the Code of Conduct that prohibits misconduct. If any member of the organization violates the guidelines or other requirements, their membership may be suspended or terminated if they are unable to resolve the matter.

The United States National Library of Medicine uses the Principles when reviewing an application for PubMed Central. If the necessary conditions are not met, the applicant will not be considered past the initial screening stage. PubMed Central has begun monitoring for style and format more thoroughly than in the past [2]. Hence, journal editors in the medical field who want to register their journal on PubMed Central should pay attention to this best practice guideline.

We can assume that commercial publishers with abundant human resources and financial support can more easily add these kinds of materials to a template webpage comparing academic societies. Thus, in this paper, only scholarly journals published by academic societies were checked for proper implementation of the guidelines.

Although active discussions have been ongoing concerning the Principles, no exhaustive study has been conducted on the status of scholarly journal compliance. Because the guidelines were recently revised in January 2018, few scholarly journals have adopted them correctly. This researcher found that only one study was presented in the European Association of Science Editors Conference that investigated whether 10 Trakya University-published journals were following the Principles. The overall compliance rate of these journals was 49% [3]. Because the guidelines are relatively new to the journal edi-

**Table 1.** Sixteen original "Principles of transparency and best practice in scholarly publishing"

Item	Sub-items
1. Website	Aims and scope Readership Authorship criteria Print ISSN Electronic ISSN
2. Name of journal	Uniqueness of name
3. Peer review process	Statement of review process Methods of peer review No guarantee of manuscript acceptance
4. Ownership and management	
5. Governing body	Editorial boards
6. Editorial team/Contact information	
8. Author fees	
11. Publishing schedule	
9. Process for identification of and dealing with allegations of research misconduct	Ethical and professional standards Step to prevent research misconduct COPE's guideline
10. Publication ethics	Authorship and contributorship Complaints and appeal Conflicts of interest Data sharing and reproducibility Ethical oversight Intellectual property Post-publication discussion
7. Copyright and licensing	Licensing information Creative Commons Policies on posting of accepted articles on third party
12. Access	Open access Subscription
13. Archiving	
14. Revenue sources	
15. Advertising	
16. Direct marketing	

ISSN, Standard Serial Number; COPE, Committee on Publication Ethics.

**Table 2.** Sixteen original principles sub-divided into 33 items and categorized into four different subjects [4]

Category	Item	Sub-items	Description
Basic journal information	Website	Aims and scope	Purpose and range of academic fields that a journal covers should be stated on the website.
		Readership	Target readers of a journal should be stated on the website.
		Authorship criteria	Certain criteria that authors should follow, including not considering multiple submissions, redundant publications.
		Print ISSN	Print ISSNs should be displayed.
		Electronic ISSN	Electronic ISSNs should be displayed.
	Name of journal	Uniqueness of name	Journal name shall be unique and not confused with another journal or mislead potential authors and readers.
	Peer review process	Statement of the review process	Any policies related to the journal's peer review procedures shall be clearly described on the journal website.
		Methods of peer review	
		No guarantee of manuscript acceptance	Journal websites should not guarantee manuscript acceptance or very short peer review times.
	Ownership and management		Ownership and/or management information of a journal shall be clearly indicated on the journal's website.
	Governing body	Editorial boards	Full names and affiliations of the journal's editorial board or other governing bodies whose members are recognized experts in the subject areas included within the journal's scope shall be provided.
	Editorial team/contact information		Journals shall provide the full names and affiliations of their editors on the website as well as contact information for the editorial office, including a full address.
	Author fees		Any fees or charges that are required for manuscript processing and/or publishing materials in the journal shall be clearly stated.
Publishing schedule		Periodicity at which a journal publishes shall be clearly indicated on the website.	
Publication ethics information	Process for identification of and dealing with allegations of research misconduct	Ethical and professional standards	In no case shall a journal or its editors encourage such misconduct or knowingly allow it to take place.
		Steps to prevent research misconduct	Publishers and editors shall take reasonable steps to identify and prevent the publication of papers wherein research misconduct has occurred, including plagiarism, citation manipulation, and data falsification/fabrication, among others.
		COPE's guideline	If a journal's publisher or editors are made aware of any allegations of research misconduct relating to a published article in their journal, the publisher or editor shall follow COPE's guidelines (or equivalent) in dealing with the allegations.
	Publication ethics	Authorship and contributorship	Journal publishing ethics and policies on authorship and contributorship.
		Complaints and appeal	Journal publishing ethics and policies on how the journal will handle complaints and appeals should be indicated.
		Conflicts of interest	Journal publishing ethics and policies on conflicts of interest/competing interests shall be provided on the website.
	Data sharing and reproducibility	Journal publishing ethics and policies on data sharing and reproducibility must be clearly stated.	
	Ethical oversight	The journal's publishing ethics and policies on ethical oversight shall be indicated.	

(Continued to the next page)



**Table 2.** Continued

Category	Item	Sub-items	Description
Copyright and archiving information	Copyright and licensing	Intellectual property	The journal's publishing ethics and policies on intellectual property should be stated.
		Post-publication discussion	The journal's options for post-publication discussions and corrections shall be provided.
		Licensing information	Licensing information shall be clearly described in the guidelines on the website, and licensing terms shall be indicated on all published articles, in both HTML and PDF format.
		Creative Commons	If authors can publish under a Creative Commons license, then any specific license requirements shall be noted.
		Policies on posting accepted articles with third parties	Any policies on the posting of final accepted versions or published articles on third-party repositories shall be clearly stated.
Access	Open access		The way(s) in which the journal and individual articles are available to readers and whether there is an associated subscription or pay-per-view fees shall be stated.
		Subscription	
Profit model information	Archiving		A journal's plan for electronic backup and preservation of access to the journal content, in the event it is no longer published, shall be clearly indicated.
		Revenue sources	Business models or revenue sources shall be clearly stated on the journal's website.
		Advertising	A journal shall indicate its advertising policy if relevant, including what types of adverts will be considered, who makes decisions regarding accepting adverts, and whether they are linked to content or reader behavior or are displayed at random.
	Direct marketing		Any direct marketing activities, including solicitation of manuscripts that are conducted on behalf of the journal, shall be appropriate, well targeted, and unobtrusive.

ISSN, Standard Serial Number; COPE, Committee on Publication Ethics.

tors, they have many areas that could be further enhanced. Therefore, the author of this paper explores how publishers respond and conform to the guidelines of the “Principles of transparency and best practice in scholarly publishing (Table 1),” as announced in January 2018.

## Methods

### Data collection

To investigate how the Principles are applied in academic society journals, a list of Science Citation Index Expanded journals was downloaded from the Clarivate Analytics website in July 2018. Among 9,058 journals, 984 that had “ASSOC,” “SOC,” or “SOC” in their address information were extracted. Furthermore, because the researchers could manually distinguish the journals from South Korea, 104 South Korean journals were collected. Duplicated data from all extracted data were excluded. Thereafter, 65 journals that were not offered in English, 135 that were using platforms from commercial publishers, and 41 with access problems were also excluded. Finally, a total of 781 journals were selected and manually combed for adherence to the Principles. All the journal's websites were accessed between October 1 and November 26,

2018 by the three researchers.

To increase the reliability of data collection, the researchers collected data from 30 of the same websites as a beta-test and came to a consensus regarding the items that they found difficult to measure before starting actual data collection. Then, to ensure that the researchers conducted the data collection with consent, 10% of the data (80 journals' homepages) were randomly selected and checked again by another researcher so that the journals were examined under the same standard.

### Data analysis

Based on collected data, the 16 best practices were divided into four different categories: basic journal information; publication ethics information; copyright and archiving information; and profit model information, as shown in Table 2 [4]. In the process of checking each practice, the 16 practices were specified with sub-items, and a total of 33 items were checked manually through journal websites. The arrangement of items was changed during this process. The definitions were drawn directly from the “Principles of transparency and best practice in scholarly publishing” [4] to elaborate on each specific sub-item in categories.

In addition, to evaluate each sub-item with a yes response,

the responses from 781 journals were divided into four scales: 0% to 25% for rarely practiced, 26% to 50% for poorly practiced, 51% to 75% for adequately practiced, and 76% to 100% for well practiced.

Moreover, to account for regional distribution, countries were categorized into one of six continents (Africa, Asia, Europe, North America, South America, and Oceania) using address information from the journal list (Table 3).

## Results

### Basic journal information

Among those 14 specific items of basic journal information, 11 items were well or adequately practiced on the websites, as shown in Fig. 1. Readership and author fees were classified as poorly practiced items because only 50% or fewer of the journals stated the items on their homepages.

**Table 3.** Based on each journal's address, collected data were categorized into one of six continents

Continent	Count	Percentage
North America	435	55.7
Asia	133	17.0
Europe	174	22.3
South America	26	3.3
Oceania	7	0.9
Africa	6	0.8
Total	781	100.0

In the case of methods of peer review, specific data were collected as shown in Table 4 (Dataset 1). Among 781 journals, 185 stated their detailed review process. The most common type was single-blind, followed by double-blind. However, 596 journals did not provide specific methods of peer review.

Based on a continent distribution analysis, two poorly practiced items were analyzed in Table 5. The readership item was indicated by only 33% of total journals. More of the journals in Europe and Asia did not follow the readership item than in North America.

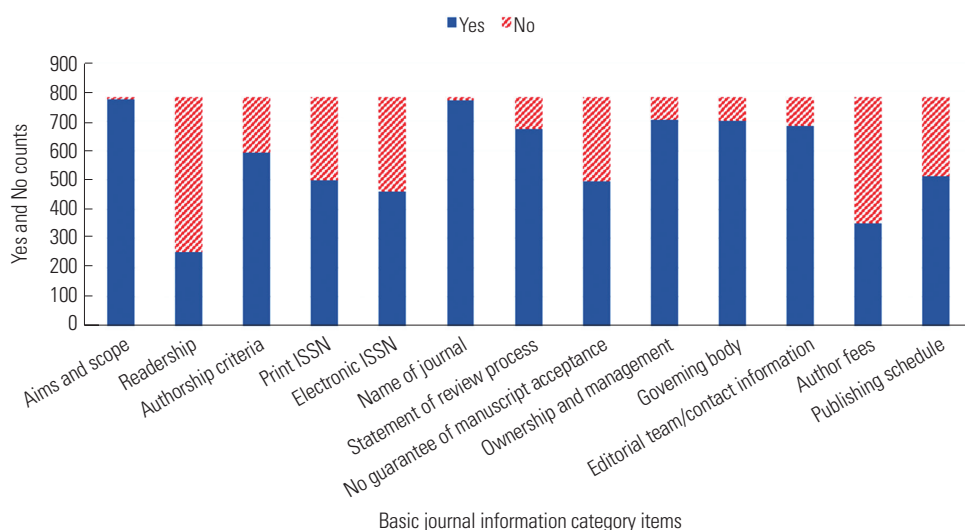
### Publication ethics information

Among the ten items, six were found to be adequately practiced (Fig. 2). In the publication ethics information category, there was no item that was well practiced. In particular, COPE's guideline; data sharing and reproducibility; and post-publication discussion were poorly practiced, with only 26% to 50% of journals indicating these items on their websites.

Three poorly practiced items were analyzed for continent distribution analysis, as shown in Table 6. The findings showed that COPE's guideline; data sharing and reproducibility; and post-publication discussion were not clearly indicated on a large number of journal homepages. Data sharing and reproducibility was indicated among only 8% of Asian journals but 36% of North American journals. Post-publication discussion was indicated among 6% of Asian journals compared to 61% of European journals.

### Copyright and archiving information

Among the five items collected, copyright and licensing information was proven to be well practiced, and Creative Com-



**Fig. 1.** Fourteen items in the basic journal information category (X-axis) were searched on 781 journals' websites for whether the items were indicated clearly and counted as "yes" or "no." ISSN, International Standard Serial Number.

mons and open-access items were adequately practiced (Fig. 3). Policies on the posting of accepted articles with third parties, subscription, and archiving were classified as poorly practiced. Number of journals which allowed open access to the electronic edition and required a subscription for the print edition was 288.

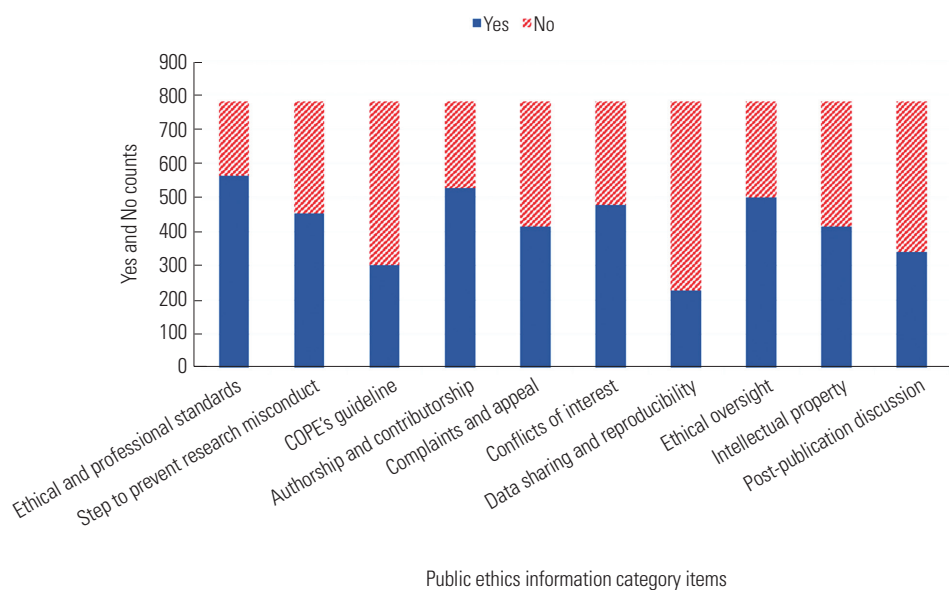
Two poorly practiced items were analyzed by continent

**Table 4.** Specific types of peer review methods as indicated on 781 journals' websites

Specific type	Count
No information	596
Open peer review	3
Single-blind	92
Double-blind	89
Triple-blind	1
Total	781

**Table 5.** Two poorly practiced items in basic journal information

Item	Count/percentage		Continent						Total
			North America	Asia	Europe	South America	Oceania	Africa	
Readership	Yes	Count	155	32	54	8	4	1	254
		Percentage	36	24	31	31	57	17	33
Author fees	Yes	Count	187	78	76	5	3	3	352
		Percentage	43	59	44	19	43	50	45



**Fig. 2.** Ten items in the publication ethics information category (X-axis) were searched on 781 journals' websites for whether the items were indicated clearly and counted as "yes" or "no." COPE, Committee on Publication Ethics.

distribution, as shown in Table 7. Policies on the posting of accepted articles with third parties and archiving were mostly found to be not clearly indicated in this category. The "yes" percentage in Asia, especially for policies on the posting of accepted articles on the third party, was comparatively lower than for other continents.

### Profit model information

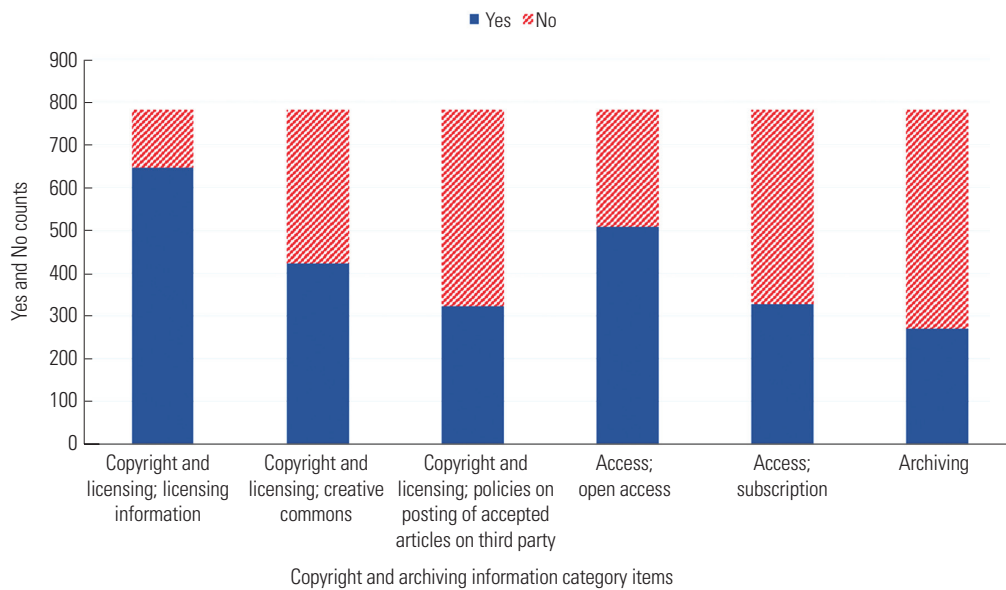
Among the three items in this category, all were classified as poorly or rarely practiced (Fig. 4). In particular, revenue sources were rarely practiced. No more than 20% of journals indicated this information on their homepage. The profit model information category can be characterized as a poorly practiced category overall.

This category was poorly or rarely practiced overall, as shown in Table 8. Two items, advertising and direct marketing, were poorly practiced items, and the revenue source item was seldom practiced.

**Table 6.** Three poorly practiced items in publication ethics information

Item	Count/percentage		Continent						Total
			North America	Asia	Europe	South America	Oceania	Africa	
COPE's guideline	Yes	Count	155	50	95	3	0	0	303
		Percentage	36	38	55	12	0	0	39
Data sharing and reproducibility	Yes	Count	158	10	54	4	1	0	227
		Percentage	36	8	31	15	14	0	29
Post-publication discussion	Yes	Count	218	8	106	6	1	0	339
		Percentage	50	6	61	23	14	0	43

COPE, Committee on Publication Ethics.



**Fig. 3.** Five items in the copyright and archiving information category (X-axis) were searched on 781 journals' websites for whether the items were indicated clearly and counted as "yes" or "no."

**Table 7.** Two poorly practiced items in copyright and archiving information

Item	Count/percentage		Continent						Total
			North America	Asia	Europe	South America	Oceania	Africa	
Policies on posting of accepted articles on third party	Yes	Count	210	10	95	4	1	1	321
		Percentage	48	8	55	15	14	17	41
Archiving	Yes	Count	111	47	107	1	2	1	269
		Percentage	26	35	61	4	29	17	34

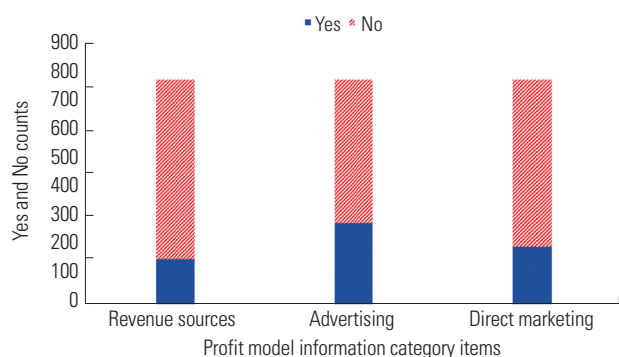
## Discussion

This study revealed 10 poorly practiced items among 33 sub-items of the "Principles of transparency and best practice in

scholarly publishing" in academic society-published journals. We found different patterns of geographic variation in compliance within each category. Whether individual journals were predominantly compliant or not was dependent on the

**Table 8.** Three poorly or rarely practiced items in profit model information

Item	Count/percentage		Continent						Total
			North America	Asia	Europe	South America	Oceania	Africa	
Revenue sources	Yes	Count	73	4	76	3	1	1	158
		Percentage	17	3	44	12	14	17	20
Advertising	Yes	Count	178	7	91	4	4	0	284
		Percentage	41	5	52	15	57	0	36
Direct marketing	Yes	Count	152	5	40	2	1	0	200
		Percentage	35	4	23	8	14	0	26

**Fig. 4.** Three items in the profit model information category (X-axis) were searched on 781 journals’ websites for whether the items were indicated clearly and counted as “yes” or “no.”

scientific society to which they belonged. For example, the *World Journal of Men’s Health*, a Korean journal, was compliant with all 33 sub-items, while journals belonging to large societies, such as the American Chemical Society or Royal Society of Chemistry, were not compliant with all these items. Based on this result, we could estimate that editors’ or societies’ interest in this best practice guideline was the deciding factor in whether they implemented it.

### Geographic variation in compliance

European journals were complying well with most best-practice guidelines compared with their Asian and North American counterparts. In particular, Asian journals rarely practiced “data sharing and reproducibility,” “policies on posting accepted articles on third-party websites” and “post-publication discussion.” “Archiving” were mostly found to be not indicated in North America. Especially for this item, the “yes” percentage was higher among Asian than North American journals. Considering the growing number of research funders who are asking to mandate open access policies in European countries, the perception of such policies is less favorable in Asian countries.

Regardless of continents, all items from the profit model information category were poorly or rarely practiced.

### Basic journal information

In the basic journal information category, the readership item was most significantly poorly practiced by journals. Academic publishing depends greatly on trust because authors and readers believe that editors will conduct a fair peer-review process as per the information provided on the journal homepage. The items, not only “readership” but also “no guarantee of manuscript acceptance,” are easily revised on the journal homepage. These items could be the first improvement target to meet the best-practice guidelines.

Good management of these contents will foster a sustainable publishing infrastructure, which will benefit all stakeholders in the publishing process [5]. Because the most critical journal information is described in this section, journal editors should pay close attention to implementing these basic journal information items well.

### Publication ethics information

The proportion of poorly practiced items is higher in the publication ethics category compared to basic journal information. In particular, “data sharing and reproducibility” and “post-publication discussion” are rarely practiced in Asia compared to Western countries. A great deal of research has been conducted on data sharing from the perspective of researchers; however, few studies have been performed on compliance with this policy from the perspective of journal editors. According to a recent study by Kim et al. [6] in a survey of 100 Korean scholarly journals, only 13 stated that they had already adopted a data sharing policy.

Data-sharing policies may differ according to the journal’s situation. Such a policy can have a positive effect because it enables more in-depth research using already existing data. PLOS has explicitly stated that data must be made publicly

available, and rare exceptions must be agreed with the editor [7]. Vines et al. [8] proved that journals with an archiving policy have 25 times higher data availability than those with no such policy. Stating the data sharing policy in the author guidelines makes the authors actively participate in data archiving, which is highly germane to the success of an open data policy. Hence, the detailed adoption level should be announced on the journal homepage.

### Copyright and archiving information

Policies on the posting of accepted articles with third parties are the most poorly practiced item in this category, and Asian journals performed comparatively worse than other continents in this regard.

SHERPA/RoMEO [9], which provides a journal deposit policy, could be a good channel to use for the enhancement of policies on the posting of accepted articles on the third party. SHERPA/RoMEO is not yet commonly used in Asian countries; among Asian journals, more attention needs to be paid to how to use the SHERPA/RoMEO site effectively. Our result is similar to that of a study by Kim and Choi [10], who analyzed the digital standards of Asian journals registered in Directory of Open Access Journals, indicating that 85% of the journals (1,689) had no digital deposit policy. Because the deposit policy differs depending on publishers and journals, most authors are confused over how to deposit their articles when the deposit is mandatory. Hence, Asian journal editors need to give more attention to improving this policy.

### Profit model information

Revenue sources from the profit model information category should also be improved by the academic society journals. Traditionally, academic societies' publishing remains the most valued function, and revenue from publishing is usually used to support society members [11]. Business models or revenue sources (e.g., subscriptions, advertising) should be clearly stated on the journal homepage to avoid misleading authors on ethical feasibility. They should be separated from the journal content and the authors and should also not influence the editorial decision. According to a Trakya University analysis, three guidelines (marketing, intellectual property, data sharing) were not met by any 10 journals which were investigated [3]. In particular, because most Asian journals are published by non-profit organizations such as academic societies, journal editors' awareness of the profit model is low. This result also showed that these business model components should receive more attention compared to other parts because none of the three items are well practiced, regardless of country.

### Limitation

The limitation of this study is that the journal homepage was the only part that was checked and examined to collect the data. Even though the study included an "information for authors" section or an author guideline on the homepage, the absence of that information on a journal homepage may not mean that a journal is not following good practice. Additionally, because of the limited resources, only the journals that clearly stated that they were published by a society were considered when collecting the raw data. Further study could be recommended that would also include surveys or interviews with journal editors regarding best practice compliance.

### Conclusion

This study was focused only on academic society journals that are registered on the Science Citation Index Expanded. As such, it would not be representative of the overall global peer-reviewed journal status. Because most small-society journals are operated by independent academic societies, society journals have difficulties in competing with the commercial publishers that invest a great deal in enhancing their infrastructure and publishing system. Society journal editors should continuously evaluate their journals regarding the "Principles of transparency and best practice in scholarly publishing" to keep up with a rapidly changing publishing environment. This research would be useful for editors of society journals when they upgrade or renovate their journal homepage to meet the best practice guidelines.

It would also help publication associations to understand how to help small societies meet the global standard. A positive step would be for society journal editors to receive regular training to keep pace with rapidly changing scholarly publication trends. Especially in Asia, the editor is less trained, and difficulties are involved in attaining proper information on this matter. Regional editors' associations, such as the Korean Council of Science Editors and Council of Asian Science Editors, could be the best channel to provide information on the latest best practice guidelines. Currently, Korean Council of Science Editors in Korea conducts regular editor training on how to apply the guideline effectively. If similar regional editors' associations can be created in other regions to actively share the latest information, more academic society journals can get the right information to meet the international publishing standards.

### Conflict of Interest

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

## Data Availability

Dataset is available from the Harvard Dataverse at: <https://doi.org/10.7910/DVN/TY2BME>.

Dataset 1. Raw data of 33 items of "Principles of transparency and best practice in scholarly publishing" from 781 society journals indexed in the Science Citation Index Expanded.

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# How many retracted articles indexed in KoreaMed were cited 1 year after retraction notification

Soo Young Kim<sup>1\*</sup>, Hyun Jung Yi<sup>2\*</sup>, Hye-Min Cho<sup>3</sup>, Sun Huh<sup>4</sup>

<sup>1</sup>Department of Family Medicine, Gangdong Sacred Heart Hospital, College of Medicine, Hallym University, Seoul; <sup>2</sup>Medical Library, Hanyang University Guri Hospital, Guri; <sup>3</sup>InfoLumi Co., Seongnam; <sup>4</sup>Department of Parasitology and Institute of Medical Education, College of Medicine, Hallym University, Chuncheon, Korea

### Abstract

**Purpose:** It aimed to investigate how many retracted articles indexed in KoreaMed were cited in both the Scopus and the Korea Medical Citation Index (KoMCI) databases and to investigate whether the frequency of post-retraction citations was different according to the presence of a retraction mark.

**Methods:** Retracted articles from the KoreaMed database were collected on January 28, 2016. Scopus and KoMCI were searched for post-retraction citations, which were defined as citations 1 year after the retraction, excluding retraction-related citations.

**Results:** The 114 retracted articles were found in KoreaMed. The proportion of retracted articles in KoreaMed, the Korean medical journal database, through January 2016 was 0.04% (114/256,000). On the journal homepage, a retraction mark was present for 49 of the 114 retracted articles. Of the 114 retracted articles, 45 were cited in Scopus 176 times. Of the 176 citations, 109 (of 36 retracted articles) were post-retraction citations. The number of citations in KoMCI, except for citations of retraction notices, was 33 (of 14 retracted articles). Of those citations, the number of post-retraction citations in KoMCI was 14 (of 8 retracted articles). The presence of a retraction mark did not influence post-retraction citations ( $P > 0.05$ ). Post-retraction citations were frequent in the range of 1 to 3 years.

**Conclusion:** Post-retraction citations that were found in both Scopus and the KoMCI occurred frequently for retracted articles in KoreaMed. Adoption of Crossmark is recommended as one choice to prevent post-retraction citations.

### Keywords

Factual database; Publishing; Republic of Korea; Retraction; Scientific misconduct

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**Correspondence to** Sun Huh  
shuh@hallym.ac.kr

### ORCID

Soo Young Kim  
<https://orcid.org/0000-0002-3205-9408>  
Hyun Jung Yi  
<https://orcid.org/0000-0003-0663-4373>  
Hye-Min Cho  
<https://orcid.org/0000-0002-1672-0200>  
Sun Huh  
<https://orcid.org/0000-0002-8559-8640>

\*These two authors contributed equally to this study as the first authors.



## Introduction

Retraction can be defined as “a mechanism for correcting the literature and alerting readers of publications that contain such seriously flawed or erroneous data [1].” The COPE (Committee on Publication Ethics) retraction guidelines state that “the purpose of retractions is to correct the literature rather than to punish the authors. Nevertheless, most authors take a negative view of retractions and may fear that they will harm their reputation.” Retractions due to research misconduct and honest errors should be distinguished [2]. In Korea, the abstracts of all local (i.e., Korea-based) medical journals are indexed in the KoreaMed database. KoreaMed is an abstract database of medical journals published from Korea launched in 1997. Out of 217,839 articles in KoreaMed published from 1990 to January 2016, the publication type of 111 articles was retraction (0.051%). The reasons for retractions included duplicate publication (57.0%), plagiarism (8.8%), scientific error (4.4%), author dispute (3.5%), and other (5.3%); the reasons were unstated or unclear in 20.2% of cases [3]. In KoreaMed retractions due to honest error accounted for a small proportion (4.4%) of cases [4]. To avoid quoting retracted articles, a notice of retraction should be issued, and a retraction mark must be provided in the HTML or PDF version of the document to notify readers [5]. It has been suggested that post-retraction citations can be divided into two types: citations before announcement of the retraction and citations after the retraction announcement [6].

A previous study investigated how many retracted articles were cited in Medline-listed journals. There were 235 retracted Medline articles from 1996 to 1997, which were cited 2,034 times after the retraction announcement. In an examination of 299 of those citations, 280 citations treated the retracted article positively [7]. For articles published in radiology journals listed in PubMed, 48 retracted original research articles were identified from 1983 to 2015. The mean number of citations of retracted articles was  $10.9 \pm 17.1$  (range, 0 to 94 citations) [5]. However, no previous research has investigated whether this trend differs across countries with different research cultures and levels of information technology. The Korea Medical Citation Index (KoMCI) is a reference citation database that includes references published in Korea of articles in KoreaMed. Therefore, if any KoreaMed articles are cited by journals published in Korea, those citations can be traced [8].

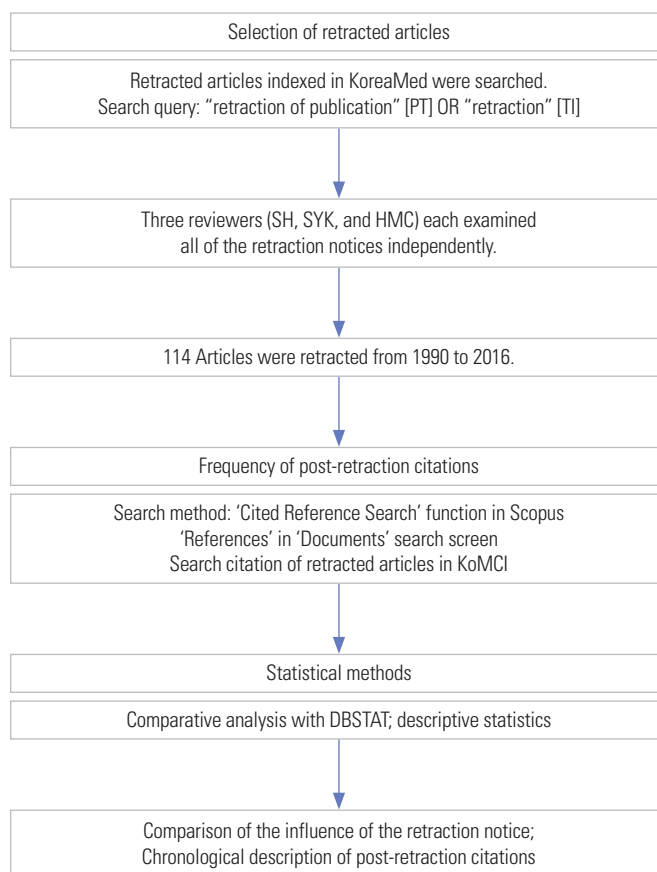
This study aimed to investigate how many retracted articles indexed in KoreaMed were cited in both the Scopus and KoMCI databases and to investigate whether the frequency of post-retraction citations was different according to the presence of a retraction mark. Furthermore, the chronological occurrence of post-retraction citations was counted.

## Methods

**Ethics statement:** No informed consent was required because this study was based on a literature database. It does not deal with human or human-originated materials.

**Study design:** This was a descriptive literature database analysis.

**Setting:** The research consisted of selecting retracted articles, analyzing their characteristics, and analyzing the frequency of their citations. The selection method for retracted articles was as follows. Retracted articles in KoreaMed were searched by a medical librarian (HMC) on January 28, 2016 (search query: “retraction of publication” (PT) OR “retraction” (TI)). Three reviewers (SH, SYK, and HMC) each examined all of the retraction notices independently. Furthermore, if opinions differed, the decision for inclusion was made based on consensus. The presence of a retraction announcement on the journal homepage or a notice in the retracted article was checked in the PDF and HTML files. In PDF, the presence of a watermark was checked. In HTML, a watermark or notification was checked.



**Fig. 1.** Diagram of the research process. KoMCI, Korea Medical Citation Index.

We searched both Scopus and KoMCI for the retracted articles in the source articles' references through the end of 2017. The citing articles of the retracted articles were searched, limited to "References" in the "Documents" search screen in Scopus. Citations of retracted articles in KoMCI were searched by inputting the bibliographic information of the retracted articles. The count was made only when an explicit citation was identified through hand-searching after the initial search for citations. The total number of citations was counted. Scopus was selected as a citation database since it comprises the greatest number of source titles with reference databases out of all reference-indexing databases at the time of the search by a librarian (HMC). Furthermore, KoMCI was selected because it is the only well-formatted citation database based on KoreaMed journals. Of the 251 KoreaMed source journal titles, 81 (32.3%) were indexed in Scopus at the time of the search. Although the other 170 KoreaMed journal titles were not indexed in Scopus as source titles, they could be searched from the reference documents that Scopus source journals cited. Post-retraction citations were defined in this study as those occurring at least 1 year after the retraction, considering the index time for the notice of retraction and the time to publication after submission. A diagram of the study design and methodology is presented in Fig. 1.

**Variables, data source, and bias:** The variables were the characteristics of retracted articles in KoreaMed and the frequency of post-retraction citations in Scopus. The data sources were Scopus, KoreaMed, and KoMCI. Retracted articles were counted and distributed according to presence of a notification of retraction. The frequency of post-retraction citations was counted in Scopus and KoMCI chronologically. No reportable bias was present since this was a literature-based study.

**Statistical methods:** Observational statistical descriptions were employed. The Mann-Whitney U-test (Wilcoxon rank sum) was used to investigate differences according to the presence of a retraction mark. The statistical software package used was DBSTAT ver. 5.0 (DBSTAT Co., Chuncheon, Korea).

## Results

At the time of the search, there were 254,000 articles in KoreaMed. Of all articles in KoreaMed, 114 were retracted (0.04%). The results for the characteristics of retracted articles in KoreaMed are presented in Table 1.

Forty-five of the retracted articles were cited in Scopus 176 times (mean  $\pm$  standard deviation [SD] of number of citations of the 45 retracted articles:  $3.9 \pm 3.7$ ; median number of citations: 3 [range, 1 to 18]). If notices of retraction were removed, the number of citations was 168 from 42 retracted articles (mean  $\pm$  SD of number of citations of the 42 retracted

**Table 1.** Characteristics of retracted articles in KoreaMed cited January 28, 2016 (n=114)

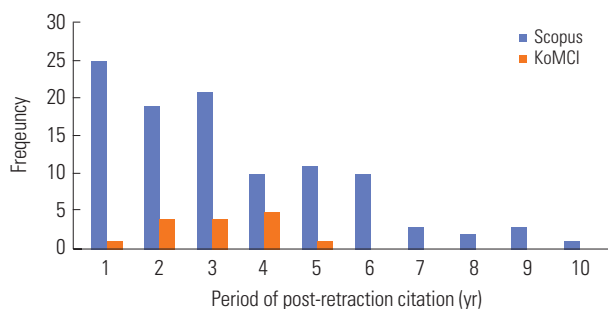
Characteristics	Number (%)
Retraction mark in PDF	
Yes	6 (5.3)
No	108 (94.7)
Retraction mark in HTML	
Yes	48 (42.1)
No	66 (57.9)
Retraction mark total	
No	65 (57.0)
PDF or HTML	44 (38.6)
Both	5 (4.4)
No. of articles cited in Scopus	
Yes	45 (39.5)
No	69 (60.5)
No. of articles cited in Scopus except notice	
Yes	42 (36.8)
No	72 (63.2)
No. of articles of post-retraction citations in Scopus	
Yes	36 (31.6)
No	78 (68.4)
No. of articles cited in KoreaMed	
Yes	22 (19.3)
No	92 (20.7)
No. of articles cited in KoreaMed except notice	
Yes	14 (12.3)
No	100 (87.7)
No. of articles cited as post-retraction citations in KoreaMed	
Yes	7 (6.1)
No	107 (93.9)

articles:  $3.9 \pm 3.8$ ; median number of citations: 2 [range, 1 to 18]), including 109 post-retraction citations from 36 articles (mean  $\pm$  SD of citations of the 36 retracted articles:  $2.9 \pm 3.6$ ; median number of citations: 2 [range, 1 to 10]) (Table 2, Dataset 1). Of the 36 articles with post-retraction citations, a retraction mark was present in 13 articles. There was no difference in the number of post-retraction citations between the articles with and without a retraction mark ( $P = 0.9865$ ) based on the Mann-Whitney U-test. Parametric statistics was not possible because the data did not show a normal distribution, although the average number of post-retraction citations of articles with a retraction mark was 3.23 and that of those

**Table 2.** Frequency of citations of retracted articles in KoreaMed obtained from the Scopus and KoreaMed databases 1 year after the retraction, excluding retraction-related citations

Retracted article	Scopus		KoreaMed	
	No. of articles	No. of citations	No. of articles	No. of citations
Cited articles				
Total	45	176	22	43
Post-retraction citations <sup>a)</sup>	36	109	8	14
Non-post-retraction citations	6	59	6	19
Retraction-related citations	3	8	8	10
Non-cited articles	69	0	92	0
Total	114		114	

<sup>a)</sup>One year after the retraction, excluding retraction-related citations.

**Fig. 2.** Chronological trends of the frequency of post-citation retractions of retracted articles listed in KoreaMed. KoMCI, Korea Medical Citation Index.

without a retraction mark was 2.91.

In KoreaMed, there were 43 citations of 22 retracted articles. If notices of retraction were removed, the number of citations was 33 (of 14 retracted articles), including 14 post-retraction citations of 8 retracted articles (Table 2, Dataset 1).

The chronological occurrence of post-retraction citations is presented in Fig. 2 (Dataset 2). Post-retraction citations were frequent 1 to 3 years after the 1-year period subsequent to the retraction notification. We found that post-retraction citations could occur 10 years after the retraction announcement.

Out of 114 retracted articles, 76 articles (66.7%) were published before 2009. Out of 76 retracted articles, the retraction announcements of 38 articles (50.0%) were published before 2009. Thirty-eight retracted articles were published from 2009.

## Discussion

**Key results:** Citations of retracted articles indexed in KoreaMed were frequent, and post-retraction citations were also frequent. Additionally, the presence of a retraction mark did not influence post-retraction citations. Out of 254,000 articles in KoreaMed, 114 were retracted (0.05%).

**Interpretation:** This rate is comparable to what has been reported in previous studies: 0.07% for *BioMed Central* [9] and 0.03% for *Journal of Bone and Joint Surgery* (American volume) [10]. In present study, the number of post-retraction citations for the 36 retracted articles in Scopus ranged from 1 to 10, with an average of 3.0 and a median of 2. Furthermore, the number of post-retraction citations for the 8 retracted articles in KoMCI ranged from 1 to 3, with an average of 1.5 and a median of 2.

In Scopus, of the 176 citations, 109 (61.9%) were post-retraction citations. To date, few analyses in the literature have presented post-retraction citation rates. Steen noted that, of the 5,503 citations of 180 retracted articles from the PubMed database between 2000 and 2010, 1,917 were post-retraction citations, with a total rate of 34.8% [11].

The lack of a retraction mark on the HTML version or PDF available from the journal homepage may explain the frequency of post-retraction citations. Of the 114 retracted articles, a retraction mark was not present for 66 (57.9%) articles in the HTML version and for 108 articles (94.7%) in the PDF version. There was no mark of retraction in 65 (57.0%) articles. In other studies, the percentage of retraction marks in PDF or HTML versions was likewise not high. In the radiology field, 37.9% (14/37) of retracted articles had a retraction mark in the PDF version, while 62.2% (23/37) did not. Furthermore, 2 of 13 (15.4%) retracted articles had a retraction mark in the HTML version, while 11 out of 13 (84.6%) of the PDF versions did not [5], and the percentage of articles with a retraction mark was 30% (14/37) in the orthopedic field [10]. In this study, there was no significant difference in post-retraction citations according to the presence of a retraction mark in the PDF/HTML versions.

As shown in Fig. 2, we found that post-retraction citations could persist for more than 10 years after the retraction announcement. The graph does not show the decrease by year

because the publication date was not considered in the graph. Bar-Ilan and Halevi [6] demonstrated that post-retraction citations may occur up to 16 years after the announcement.

Decrease of retracted articles after 2009 may be results of enforcement policy which was supported by the publication of the *Good publication practice guidelines for medical journals* in 2008 by the Korean Association of Medical Journal Editors. **Why are retracted articles frequently cited even after the retraction announcement?:** Bar-Ilan and Halevi [6] suggested four reasons: First, the full texts of retracted articles may remain freely available on the web. Second, public or media attention can cause an increased frequency of negative citations. An example was a retracted article that “evoked a public debate regarding the safety of genetically modified (GM) foods”. In this case, researchers cited retracted articles to warn the public about the incorrect information contained in the retracted article [6]. Third, in some cases, data and image manipulation was not considered to be as serious as other violations which suggest that articles retracted for such reasons can continue to be cited. Fourth, if the reason for retraction was text-recycling or duplicate publication, the data themselves are not a problem from an editor’s perspective; therefore, they may continue to be cited after the retraction announcement.

There are two possibilities for the status of post-retraction citations in the Korean medical literature. First, it is possible that the authors did not know that the documents in question had in fact been retracted. Moylan and Kowalczyk [9] suggested that readers can be unaware of articles being retracted because retraction notices are seldom cited. As mentioned above, the PDF or HTML versions of retracted articles did not contain retraction marks in a fairly high percentage of cases; therefore, an author can inadvertently cite retracted articles. Authors can also obtain articles through non-publisher websites that provide a substantial number of articles. PubMed Central, educational websites, commercial websites, advocacy websites, institutional repositories, and personal Mendeley libraries are examples of such sites [2,12]. Secondary citations, in which the author does not look at the article itself but cites only the references of other articles, is also a situation in which the author may not know the retraction status of a paper. The second possibility is that the authors knew that the articles had been retracted but cited them for other reasons. In the Korean medical literature, the most common reason for retraction is duplicate publication [3]; therefore, an author may cite a retracted article without any doubt about the scientific validity of the article, which results in a positive citation.

**How can we efficiently reduce post-retraction citations?:** One method for editors or publishers is the adoption of Crossmark (the “Check for updates” button), which was launched in April 2012 and sends a signal to researchers that publishers

are committed to maintaining their scholarly content. It gives scholars the information they need to verify that they are using the most recent and reliable versions of a document. Readers simply click on the Crossmark logos on PDF or HTML documents, and a status box tells them if the document is current or if updates are available [13]. This system was adopted by a journal in Korea in 2013 [14]. In 2016, 105 (43.4%) of the 242 KoreaMed journals had adopted it [15]. However, it might be difficult for researchers to confirm the up-to-date status of articles published before April 2012. If this system is implemented for the HTML and PDF files of all scholarly articles, there may be a drastic decrease in post-retraction citations. Of course, no clear evidence yet exists of the effect of Crossmark in preventing citations of retracted articles. Six years have passed since the Crossmark service was launched for scholarly journals in Korea. Therefore, more concrete findings should be collected on the effects of Crossmark. At present, this system is one of the best solutions for elucidating the present status of articles.

Another solution is to visit the Retraction Watch Database (<http://retractiondatabase.org/>), on which it is possible to search for retracted articles by inputting relevant information. Another method that researchers can use is to visit the journal homepage to check for any notice of retraction or errata, because PDFs of articles can be distributed through a variety of sources, databases, and repositories.

**Why did authors cite retracted articles?:** The reason why authors cited retracted articles is difficult to elucidate, because there were no data on this topic. If authors are aware of the present status of retracted articles, they are reluctant to cite them. Furthermore, the editors or manuscript editors usually did not check the status of references during the editorial process, although they always check the references for adherence to the style and format of the journal. Therefore, manuscript editors are recommended to check the references to identify whether they have been retracted. All retracted articles are not scientifically flawed, and there are a variety of reasons for retraction. One reason is duplicate publication, in which case, authors are recommended to cite the first-published article. Although it is up to authors to cite or not to cite retracted articles, caution should be used when citing retracted articles. If a retracted article is cited positively, authors should be notified by the editorial office.

**Limitations:** There was no recordable limitation to this study.

**Conclusion:** In this study, we found that the citation frequency of retracted articles from medical journals in Korea was considerable. Citations occurred from not only Scopus journals, but also from KoreaMed journals. If the number of medical journals in Scopus (11,734) and KoreaMed (251) is considered, the number of post-retraction citations from KoreaMed

journals (14) is not relatively smaller in comparison with the 109 post-retraction citations from Scopus journals. Retraction announcements did not affect the frequency of post-retraction citations for articles published in Korea; therefore, another measure should be introduced to clarify retraction status. Furthermore, this study provides unique data on post-retraction citations among medical journals from a single country, which was possible owing to the presence of the abstract database (KoreaMed) and the citation database (KoMCI).

## Conflict of Interest

Hye-Min Cho serves as an editorial board member of the *Science Editing*, but has no role in the decision to publish this article. Except for that, no potential conflict of interest relevant to this article was reported.

## Data Availability

Dataset is available from the Harvard Dataverse at: <https://doi.org/10.7910/DVN/KR55YV>

**Dataset 1.** Raw data of the retracted articles.

**Dataset 2.** Raw data of the chronological citation frequency of post-retraction citations of retracted articles in KoreaMed.

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# Internal affairs: the fate of authors from the University of the Philippines accused of plagiarism, 1990s to 2010s

Miguel Paolo P. Reyes, Joel F. Ariate Jr.

Third World Studies Center, College of Social Sciences and Philosophy, University of the Philippines Diliman, Quezon City, The Philippines

### Abstract

**Purpose:** This study centers on 25 cases of plagiarism in scientific publications committed by faculty members and students of the University of the Philippines and dealt with by eight of the university's academic publishers.

**Methods:** We focus on the publishers' responses to these cases, details of which we obtained from various sources, vis-à-vis the University of the Philippines' policies on plagiarism.

**Results:** The responses to plagiarism were found to vary, at times seemingly arbitrarily, but tended toward protecting the identities or details of the accused, unless the case became publicized.

**Conclusion:** Such maintenance of confidentiality is inimical to the fulfillment of academic publishers' duties to the rest of the academic community. We herein suggest policies to address the identified deficits.

### Keywords

Confidentiality; Philippine publishers; Plagiarism; University of the Philippines

### Introduction

Reputable academic or scholarly publishers necessarily have stringent policies on plagiarism. Without plagiarism checks, a scholarly publisher risks publishing texts that not only fail to follow accepted norms of attribution, but also potentially pollute or distort scientific literature, making the previously published (perhaps even refuted or falsified) seem novel, or obscuring the actual progression of scholarly inquiry on a particular matter. From a legal perspective, plagiarism per se is not a crime in any jurisdiction, but plagiarized content might be copyrighted. In short, checking submissions for plagiarism is in line with the gatekeeping functions of academic editors [1].

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**Correspondence to**  
Miguel Paolo P. Reyes  
[mpreyes3@up.edu.ph](mailto:mpreyes3@up.edu.ph)

**ORCID**  
Miguel Paolo P. Reyes  
<https://orcid.org/0000-0003-2496-6785>  
Joel F. Ariate Jr.  
<https://orcid.org/0000-0001-8120-0255>

Currently, there are no national guidelines on dealing with plagiarism for academic publishers in the Philippines, or even for the University of the Philippines (UP), the country's national university and the institution focused on here. While the numerous scholarly journals published by various UP units may have their own internal counter-plagiarism processes and measures, few such processes and measures are accessible via the university's online journal portals (e.g., <http://www.journals.upd.edu.ph/>, <https://ovcre.uplb.edu.ph/journals-uplb/>, and <http://ojs.upmin.edu.ph/>) or other UP journal websites. Exceptions include the *Philippine Journal of Social Development*, whose publicly accessible 2016 editorial and publication policies include a definition of and guidelines on plagiarism [2], and the shared 2009 "Journal policy on research misconduct" of *Humanities Diliman*, *Science Diliman*, and *Social Science Diliman*, which has been included in open-access issues of these journals since 2016 [3]. Indeed, participants in one of the few recent nationwide gatherings of journal editors in the country did not consider plagiarism to be a major concern [4].

Besides being little discussed locally as a policy matter by academic publishers, plagiarism in the Philippines in any context is still largely understudied. Extant work generally focuses on plagiarism by students, tackling pedagogical interventions [5], or plagiarism in relation to legal issues [6]. Studies discussing scholarly publishing in the Philippines tend to focus

on the factors constraining publishers from matching the quality and quantity of output of their Western counterparts, sustainability concerns, and other publishing challenges [7-9]. No existing publication has thus far intensively engaged with the subject of plagiarism by faculty members of any Philippine educational institution.

Given the lack of standardized rules and dearth of scholarship, this study is an initial attempt to analyze the responses of academic publishers in the Philippines to plagiarism, with the aim of using these responses to suggest counter-plagiarism policies for similarly situated academic editors. Specifically, this study looks at cases wherein both the publisher and the author(s) accused of plagiarism are or were members of UP's academic community (i.e., as a faculty member or student), with the presupposition that such cases are particularly difficult to address because they involve internal policing. Focusing on such cases thus allows us to examine the nexus between the preservation of institutional reputations or academic integrity, and the scholarly gatekeeping function of academic editors.

## Methods

Data discussed in this paper were mainly gathered during two research projects, both of which aimed to analyze UP's responses to plagiarism, with one focusing on plagiarism by

**Table 1.** UP rules on confidentiality for records of student and faculty member cases

	Period	Rules (year implemented)	Relevant text of provision
Students	1976-2014	Section 24 of the Rules and Regulations on Student Conduct and Discipline	"Original records pertaining to student discipline shall be under the custody of the Vice Chancellor for Student Affairs. Such records are hereby declared confidential and no person shall have access to the same for inspection or copying unless s/he is involved therein, or unless s/he has a legal right which cannot be protected or vindicated without access to or copying of such records."
	2014-present	Section V.7. of the Code of Student Conduct of UP Diliman (completed in 2012, adopted by other UP constituent universities)	"Original records pertaining to student discipline shall be under the custody of the [Student Disciplinary Council] and/or the Dean. Such records are hereby declared confidential and no person shall have access to the same for inspection or copying unless s/he has a legal right which cannot be protected or vindicated without access to or copying of such records, or unless authorized in writing by the Chancellor."
Faculty	1961-present	Article 247 of the Revised Code of the University of the Philippines, as stated in Section 10.2.11 of the 2003 University of the Philippines Diliman Faculty Manual (adopted by other UP constituent universities)	"No member of the faculty, officer, or employee shall publish or discuss publicly charges or complaints against any other member of the faculty, officer, or employee concerning his/her official duties or his/her private life or conduct."
	1963-present	Section 13 of the Rules and Regulations on the Discipline of Faculty Members and Employees	"All proceedings held before the [Hearing Committee] shall be set down in writing by a competent stenographer and shall be confidential. Any disclosure of matters related to the proceedings shall subject the offender to disciplinary action."

UP, University of the Philippines.

faculty members throughout the UP System, which has eight constituent universities and 17 campuses across the Philippines, and the other on faculty and student plagiarism cases at UP Diliman, the System's largest university. For both projects, the main obstacles to data gathering were UP's strict rules on confidentiality in cases involving research malpractice or academic dishonesty, as previously stated in relevant publications [10,11]. These rules are listed in Table 1.

Despite these restrictions, we were able to identify a number of documented and verifiable cases of plagiarism by members of UP's academic community via nonconfidential university records (e.g., minutes of the meetings of the UP Board of Regents), key informant interviews, and online and print publications. UP Diliman's Office of the Chancellor authorized us to examine selected final and executory student case files of the defunct Student Disciplinary Tribunal. Regarding faculty case files, we wrote to relevant offices in all UP constituent universities requesting access to case decisions or resolutions, assuming that such are either beyond the level of charges or complaints mentioned in the "UP system code" or outside of the verbatim proceedings contemplated in the "Rules and regulations on the discipline of faculty members and employees"; few offices shared our interpretation, however, with only two granting access to preselected case files. Data gathering was primarily conducted between 2011 and 2015. Cases identified after 2015 became known to us through chance encounters with details in published texts or our positions on the editorial staff of the publication involved. We identified 74 verifiable plagiarism cases—wherein at least a description of what was committed and how the case was handled may be obtained from authoritative sources—involving dozens of UP faculty members and students at UP Diliman, as well as a handful of students at other UP constituent universities, all occurring between 1936 and 2018. Of these cases, 34 are detailed in a 97-page confidential document we wrote titled "Final research report on academic and authorial integrity in University of the Philippines-Diliman," a copy of which was deposited with UP Diliman's Office of the Vice Chancellor for Research and Development.

A total of 25 of the 74 cases involved students and faculty members of the UP System who, during the time they were connected to UP, had their work published or considered for publication by a UP publisher (i.e., a unit, department, or college within UP with a publications program). The term "publication" here is broadly construed; included are dissertations, which are publicly accessible through various libraries and whose editors may be considered to be the dissertation adviser/committee members. Eight UP publishers, two of which are not based at UP Diliman, are involved in the cases discussed here.

We know the details of 18 of the cases because of our involvement with the publications that processed the works. We received information about one case from informants and an examination of the submission in question. The details of another case came to our attention via interviews with current and former university officials. A UP office gave us access to selected confidential documentation of one case, and we filed one of the other cases ourselves. Lastly, three cases are discussed in public records or publications.

Given that this study seeks to make case-based policy recommendations, we concentrate on publishers' responses to plagiarism in a work they had published or are considering for publication. We provide context by indicating the decade when the plagiarism was committed, whether the offense was discovered after a faculty member or student had already been separated from the institution or graduated, and if the accusation was made before or after a work's publication, thereby showing possible jurisdictional constraints on the actions of the publishers involved.

Through personal knowledge, social media, and websites such as online employment services, we attempted to track the post-response effects on the academic careers and scholarly credibility of the faculty members and students accused in the 25 cases. These effects served as a proxy for response effectiveness, assuming that the thrust of the response generally is punitive rather than rehabilitative. We initially assumed that those who receive the most severe penalties (e.g., termination/involuntary resignation or degree withdrawal) suffered the most in terms of loss in scholarly stature (here shown by the approximate number of years between the final case response and the resumption of an academic career). To test this assumption further, we also analyzed the post-response effects on UP faculty or students whose work containing plagiarism was published by non-UP publishers. Regarding those who did not resume their academic careers after committing plagiarism, we tracked their post-response publications, if any, and non-self-citations to see if their scholarly contributions continued to be valued.

## Results

Table 2 summarizes the 25 plagiarism cases committed by UP faculty members or students and published by UP. We gave the cases numerical designations, with the order determined by the approximate date when the publisher initiated proceedings in response to plagiarism. We cannot mention the constituent university, publisher, or any similar identifying information because of UP's confidentiality rules. Besides confidential records, key informants, the text of the manuscripts or publications themselves, and our personal knowledge, other



**Table 2.** Summary of UP academic community plagiarism cases involving UP publishers

Case no.	Decade	Publication type	Plagiarism discovered after separation from service/graduation	Plagiarism discovered after publication	Response/action taken
1	1990s	Textbook	No	Yes	Author reclassified persons previously termed co-writers/collaborators into research assistants, relegating them to the acknowledgements section of the book's second edition; an errata sheet was pasted onto copies of the book's second edition, which stated that the assistants should be called contributors and the author should be called an editor Errata also indicated that the book is not published by UP, but university catalogues and both editions of the book state UP as the book's publisher; publisher apparently disowned the book Author's contract as instructor not renewed
2	1990s	Dissertation	No	No	Publisher forwarded case to higher authorities, with recommendation to withdraw the author's doctorate Degree of author withdrawn
3	2000s	Dissertation	No	Yes	Author's privileges and teaching duties were curtailed Publisher forwarded case to higher authorities Caveat regarding dissertation's contents was ordered inserted in copies of the publication
4	2000s	Manuscript for an academic journal	No	No	Manuscript rejected Publisher filed an official complaint with higher authorities Faculty terminated from service
5	2000s	Introduction of an edited book	No	No	Chapter rejected; copies of the introduction were removed from printed copies of the book and replaced with a new introduction from a different author
6	2000s	Manuscript for an academic journal	No	No	Manuscript rejected
7	2000s	Academic journal article	Yes	Yes	No action; article remains accessible online; no retraction issued
8	2000s	Dissertation	Yes	Yes	Copies of the dissertation pulled out from the University's libraries and removed from the UP online catalogue Case was forwarded to higher authorities with recommendation to withdraw the author's doctorate Degree of author withdrawn
9	2010s	Manuscript for an academic journal	No	No	Manuscript rejected
10	2010s	Manuscript for an academic journal	No	No	Manuscript rejected
11	2010s	Manuscript for an academic journal	No	No	Manuscript rejected
12	2000s	Academic journal article	Yes	Yes	No action by the publisher Investigation of accusation by a committee of UP faculty members not connected to the publication requested by the accused; accused exonerated

(Continued to the next page)

**Table 2.** Continued

Case no.	Decade	Publication type	Plagiarism discovered after separation from service/graduation	Plagiarism discovered after publication	Response/action taken
13	2010s	Manuscript for an academic journal	No	No	Manuscript rejected Faculty member who was leader of the project from which the paper was drawn from was informed of the plagiarism issue
14	2010s	Manuscript for an academic journal	No	No	Faculty member forced to resign Manuscript rejected
15	2010s	Manuscript for an academic journal	No	No	Author was requested to make adjustments to the manuscript, which was eventually accepted for publication
16	2010s	Manuscript for an academic journal	No	No	Manuscript rejected
17	2010s	Manuscript for an academic journal	No	No	Manuscript rejected
18	2010s	Manuscript for an academic journal	No	No	Manuscript rejected
19	2010s	Textbook	No	Yes	Commitment from head of constituent university/ publisher that plagiarism issues in the book will be taken into account in the material's revision
20	2010s	Manuscript for an academic journal	No	No	Manuscript rejected
21	2010s	Manuscript for an academic journal	No	No	Manuscript rejected
22	2010s	Manuscript for an academic journal	No	No	Manuscript rejected
23	2010s	Manuscript for an academic journal	No	No	Manuscript rejected
24	2010s	Manuscript for an academic journal	No	No	Manuscript rejected
25	2010s	Manuscript for an academic journal	No	No	Manuscript rejected

UP, University of the Philippines.

sources for Table 2 are a court decision [12], an issue of the *UP Gazette* [13], and a book [14].

In case 12, which ended in exoneration, the accused had already voluntarily separated from UP because of career advancement well before her case was investigated. Cases 5 and

7 involve the same person, who had previously been scheduled for termination due to another dishonesty issue. Thus, these cases are excluded from Table 3, which shows how the specific responses to plagiarism by publishers within UP and in other institutions are related to the academic careers of the

**Table 3.** Plagiarism response/response result and academic careers of UP faculty members and students

Response/response result	UP publishers			Non-UP publishers		
	Case no.	Years before resuming academic career after response	Case publicity level <sup>a)</sup>	Case letter (decade)	Years before resuming academic career after response	Case publicity level
Termination/ involuntary separation from service	1	≤ 1 year	Low	C (1990s)	Not resumed	None
	4	≤ 1 year	None			
	13	≤ 1 year	None	D (2000s)	Not resumed	Medium
				E (2000s)	≤ 9 years	Medium
	G (2000s)	Not resumed	Medium			
Degree withdrawn	2	Not resumed	Medium			
	8	≤ 2 years	Medium			
Curtailed duties and privileges	3	N/A	None			
Publicized finding of “academic sloppiness”				H (2010s)	Not resumed	High
Manuscript rejected	6	N/A	None			
	9	N/A	None			
	10	N/A	None			
	11	N/A	None			
	14	N/A	None			
	16	N/A	None			
	17	N/A	None			
	18	N/A	None			
	20	N/A	None			
	21	N/A	None			
	22	N/A	None			
	23	N/A	None			
	24	N/A	None			
25	N/A	None				
Pre-publication correction	15	N/A	None			
Commitment to correct post-publication	19	N/A	None	A (1930s)	NA	None
Complaint filed, case unresolved				F (2000s)	NA	None
Identified, no complaint/action				B (1990s)	NA	None
				I (2010s)	NA	None

UP, University of the Philippines; NA, not applicable.

<sup>a)</sup>Gradations: 1) None (absolutely confidential cases; only parties involved and concerned university officials were privy to the case details); 2) Low (details of the case can be found at most in one print publication with limited distribution); 3) Medium (details of the case could be viewed, at most, in 2 print and/or 1 online publication soon after the case’s resolution); 4) High (details of the case easily obtainable, offline and online, appearing in various publications and having had mass media coverage while it was still pending or immediately after it was resolved).

accused. The non-UP publisher cases are designated as cases A-I and arranged in approximate chronological order. Since we considered suspension or termination of academic career as the main effect, we gave a notation of “N/A” (not applicable) for cases wherein careers were never suspended or terminated because of a response to plagiarism. We also highlighted case publicity level. In terms of the relatively public cases (2, 8, D, and G), most became public because the forums chosen for resolution needed decisions to be published, while details of two cases (E and H) were leaked to the media. Besides the abovementioned sources for Table 2, the other sources for Table 3 are a book chapter [15], two *UP Gazette* issues [16,17], a news article [18], and the unpublished text of a presentation [19].

We will provide here as much contextualization as is allowed by the university’s confidentiality rules. In case 1, though the author’s temporary faculty member appointment was not renewed, he was retained as a member of UP’s non-teaching academic staff before becoming affiliated with other institutions. In case 4 and 13, the faculty member who resigned or was terminated continued to have an academic career outside UP, despite the seriousness of their offenses in terms of the quantity or contribution of plagiarized content in their work. In two related cases (8 and G), the sections with plagiarized content were so crucial to the purportedly new work that doubt was cast on the originality of their projects. The author in case 8 was nevertheless able to return to teaching outside UP after about 2 years, while case G’s author con-

tinues to work in a field related to his discipline. The author in case D has followed a track similar to that in case G.

Although the authors in case 2 and case C ceased to be connected to the academe because of plagiarism, they were able to have scholarly work published and deposited in university libraries. Other scholars have cited the post-academe publications of both more than once. Meanwhile, case H’s author was effectively promoted to a position wherein he is directly involved in the production of texts that are among the main objects of analysis in his discipline. Lastly, even the author in cases 5 and 7 has been able to pursue a career in publishing outside of the Philippines.

### Discussion

As stated in our introduction, the thrust of these responses to plagiarism was assumed to be punitive rather than rehabilitative, even if a relatively lenient response was executed most of the time. This assumption was based on our previous findings examining the university’s rules on plagiarism [20], which are summarized in Table 4.

Especially at UP Diliman, there only recently has been a turn from the punitive/legalistic to the corrective/academic-ethical regarding policies on plagiarism for UP’s faculty and students. However, as our data shows, the absence of clear guidelines has left responses to plagiarism—from harsh penalties to no punishment at all—entirely within the discretion of UP publishers.

**Table 4.** Main rules and regulations on plagiarism for UP students and faculty members

	Period	Rules (year implemented)	Summary of provisions
Students	1976-2014	Sections 2a, 2m, 25a, and 25m of the Rules and Regulations on Student Conduct and Discipline	Dishonesty in relation to studies (plagiarism, cheating in examinations) is penalized with suspension for at least one year, while any other form of misconduct (including plagiarism in a non-academic context) may be penalized with, at most, expulsion, depending on how grave the offense was and the attendant circumstances
	2014-present	Section 1.a, Article IV of the Code of Student Conduct of UP Diliman	Plagiarism merits a “corrective measure” of, at the minimum, one semester (up to expulsion) for a first offender, and expulsion for recidivists
Faculty	1963-present (other UP constituent universities)	Section 18 of the Rules and Regulations on the Discipline of Faculty Members and Employees	An employee may be removed, suspended, or reprimanded due to dishonesty (which has often been contemplated to include plagiarism)
	1963-2001 (UP Diliman) 2001-present (UP Diliman)	Decision during the 75th Meeting of the UP Diliman University Council in July 2001	Academic dishonesty cases (including cases of plagiarism) are brought under the jurisdiction of an Ethics Committee, whose function is not to immediately recommend administrative sanctions but to serve as “peer reviewers” of cases such as those involving intellectual dishonesty <sup>a)</sup>

UP, University of the Philippines.

<sup>a)</sup>Not successfully implemented given, as per confidential key informants, the lack of faculty who wanted to serve as members of the Ethics Committee. The jury system (no standing committee, case-to-case committee members drawn from all full professors) was implemented by the UP Board of Regents on 27 October 2011.

Besides this arbitrariness, the data also reveals that a plagiarism charge and/or penalty does not necessarily mean that credibility becomes widely questioned. One possible explanation is that most of those charged and proven to have committed plagiarism in these cases may have been able to rely on the mitigating circumstance of being a first-time/one-time offender. Besides such circumstances, the rarely breached university rules on confidentiality almost always ensure that the careers of members of UP's academic community remain undisturbed by a UP publisher finding plagiarism in their work. These very rules keep us from thoroughly discussing response appropriateness (type, severity) in relation to the extent of plagiarism committed.

As previously noted, we wanted to examine how UP publishers deal with the need to keep the reputation/integrity of their institution intact while also fulfilling their gatekeeping functions. Strict confidentiality allows publishers to dispose of plagiarism-laden submissions without getting a reputation for being overly strict or hostile to authors and, in the case of the "internal affairs" discussed here, to maintain a veneer of high academic standards for the university to which they are attached. Confidentiality, however, does not help publishers fulfill their responsibility to keep the fruits of dishonesty from being published. If only the author is informed of his or her plagiarism, it cannot be guaranteed that such a breach in proper scholarship is corrected; work with serious plagiarism issues may still be disseminated and referenced by other scholars. Indeed, of the 25 cases involving UP publishers and the nine cases involving non-UP publishers tackled here, most, if not all, of the works that were proven to be plagiarized after publication remain accessible in at least one library; save in one case, promises to correct disseminated publications were not known to have been carried out. At least one of the manuscripts that was rejected after submission was later published by another journal, with problematic sections still unaddressed.

To address response arbitrariness and the ill effects of strict confidentiality—and perhaps to serve as a deterrent against submitting plagiarized manuscripts—we recommend that 1) all UP publishers write down and publicize clear guidelines on how they will deal with plagiarism, including rules on retraction; 2) UP publishers require a paper submission provenance detailing where the work was previously submitted, why it was withdrawn or rejected, and, if the rejection was due to plagiarism, what the publisher's findings were and how they were addressed; 3) a list of those discovered to have committed plagiarism—along with the findings of the editor(s) who assessed their work and the penalties given, if any—is made accessible to the community of UP publishers and, ideally, all academic publishers who want information on sub-

mitting authors; and 4) a body is established to manage the aforementioned list and monitor if penalties or corrective measures are implemented.

### Conflict of Interest

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

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# How should medical researchers respond to false copyright infringement claims?

Sung Pil Park<sup>1</sup>, Eric Yong Joong Lee<sup>2,3</sup>

<sup>1</sup>Korea Advanced Institute of Science and Technology, Daejeon; <sup>2</sup>College of Law, Dongguk University, Seoul; <sup>3</sup>YIJUN Institute of International Law, Seoul, Korea

## Abstract

Serious concerns have been raised about the Morisky Medication Adherence Scales (MMAS-4 and MMAS-8) ever since researchers from Asia and other regions were claimed to have used the MMAS without a license. Donald Morisky and his team have claimed that numerous authors have infringed copyright, trademark, or other rights over the MMAS. This case study will scrutinize whether the MMAS is protected by any intellectual property rights, including copyright and trademark. In many cases, the authors have not applied the MMAS for their research, but have only introduced or described the MMAS in papers that are accessible and open to the public. The MMAS is a measure to keep track of and check the regularity and accuracy with which patients take their medications; it is not meant as a diagnosis and does not form a basis for treatment plans. If another researcher rephrases the questions in a way that achieves a certain level of originality, not infringing the original expressions of the MMAS, then Morisky and his team may not be able to claim infringement of its copyright. Even assuming that the MMAS is subject to copyright, the authors can raise a “fair use” defense. Concerted actions may be necessary for researchers to protect academic integrity and the public nature of scholarly works. The fair use of the MMAS in a scholarly article should not be barred by false copyright infringement claims.

## Keywords

Survey questionnaires; Copyright; Fair use; Infringement; License

## Introduction

The so-called Morisky Medication Adherence Scales (MMAS-4 and MMAS-8) have become a point of contention recently [1]. Dr. Donald Morisky and his team, including Mr. Steve Trubow, claim that researchers who use the MMAS without permission “steal Dr. Morisky intellectual property” and “divulge his trademark protected *trade secret* scoring and coding criteria.” Mr. Trubow also claims that such researchers disclose incorrect MMAS scoring and coding and thereby cause “harm to the patients.” Having found multiple very similar cases where

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**Correspondence to** Eric Yong Joong Lee  
groatian@dongguk.edu

**ORCID**  
Sung Pil Park  
<https://orcid.org/0000-0002-7778-4814>  
Eric Yong Joong Lee  
<https://orcid.org/0000-0001-5640-490X>

medical researchers in Asia have been exposed to such infringement claims for using MMAS scoring and coding without permission, we are motivated to address the fundamental legal issue of whether Dr. Morisky's MMAS is protected under any intellectual property law, especially and most importantly copyright law.

## Case Analysis

### Substantive claim of copyright infringement

The first scenario to consider is when a medical researcher uses these scales (MMAS-4 or MMAS-8) as part of his/her academic research. Dr. Morisky and his company, MMAS Research LLC (MRL), are both already referred to within the medical research community. A lawsuit was recently filed by MRL against the Regents of the University of California, San Francisco (case 2:18-cv-09767; November 20, 2018). However, this case was closed on May 30, 2019 with a "Stipulation of Dismissal with Prejudice," which implies that the case was dismissed permanently based on an agreement between the parties and cannot be brought back to the court. Because the court did not render its opinion on the plaintiff's claims, we do not yet have an authoritative interpretation of the legal issues related to MMAS-related cases [2].

The general practice in the community is for researchers to send emails to Dr. Morisky and/or Mr. Trubow for permission to use the MMAS before starting their research. However, in a number of cases Morisky and Trubow did not respond to email requests until the researcher gave up on using the scale or decided to use it anyway. From the replies to the Retraction Watch article presented above, we can see quite a few instances of such "delayed responses" to license requests from researchers. We have also heard similar experiences of delayed communication with the MMAS personnel from medical researchers in Asia [1]. In cases where the researchers decided to use the MMAS anyway, Mr. Trubow sent them accusatory emails and communications for not consulting with him before the research began, and asked them to obtain "retroactive" licenses to correct their alleged infringement of copyright, trademark, or trade secrets over the MMAS, which cost significantly more than ordinary licenses [1].

Although our discussion in this article is focused on MRL's primary claim of copyright infringement, we do not consider that claims of trademark infringement or trade secret misappropriation could be established against researchers using the MMAS. First of all, researchers' use of the names of Dr. Morisky and/or the MMAS in their articles constitutes the so-called "nominative use" doctrine, which was first conceptualized in *New Kids on the Block v. News America Pub* case [3]. Applying this doctrine to the MMAS-related cases, we may

conclude that there has been no trademark infringement by researchers, for three reasons: first, it is almost impossible to identify the MMAS and/or Dr. Morisky without mentioning their names; second, researchers usually use their names only to the extent that is necessary for such identification; and third, researchers do not imply any sponsorship or endorsement by the trademark holders. In the motion to dismiss the complaint in *MRL v U.C. Regents*, the defendant argued against MRL's trademark infringement claim using similar reasoning [2].

Regarding MRL's claim of trade secret misappropriation, it is not clear whether: there is any secret information possessed by MRL or Dr. Morisky, and disclosed or divulged by researchers; whether such information has any commercial value (not according to claims made by MRL or Dr. Morisky, but based on objective criteria); and whether MRL and Dr. Morisky made reasonable efforts to maintain the secrecy of the information [4]. Unless the MRL team can prove that these three conditions are met, trade secret misappropriation is not a valid claim against researchers using the MMAS, which is published and accessible online to any person. While the conditions may vary by jurisdiction, these three conditions provided in Art. Thirty-nine of the Agreement on Trade-Related Aspects of Intellectual Property Rights are standard requirements for trade secret protection.

### Copyright infringement claims

MRL sends a warning letter to individual researchers or to their institution (accusing the institution of being vicariously liable for the researcher's use of MMAS without a license) indicating their intent to claim copyright and other intellectual property rights [2]. In its warning letter, MRL recommends that the author(s) should throw in the towel (i.e., MRL demand full and instant compliance of the author(s) with the rules that MRL established itself). The communication between MRL (especially Mr. Trubow) and the author(s) is not reciprocal at all. MRL offers a retroactive license to the author(s) and/or their institution on a take-it-or-litigate basis. MRL usually puts the author(s) at risk by threatening to initiate a lawsuit, copying names of their lawyers [5].

### Successful claims: reasons

MRL could employ some legal tactics to transform its "license" agreements into "service" agreements. Based on such agreements, MRL provides training and related services for the researchers to correctly use the MMAS. Therefore, such education and training services, as well as the "license" to use the MMAS copyright and other intellectual property rights, are furnished in consideration of the royalties paid by researchers. Therefore, it is not easy for scholars to later argue that the agreements with MRL are invalid, because they did



already receive such “services” from MRL.

## Legal Analysis

### Question 1: Is Morisky’s scale protected under copyright law?

Copyright protects an original expression of authorship. Therefore, this question can be reformulated as follows: Does the MMAS contain any elements of original expression in it that can be protected under the copyright regime?

Dr. Morisky’s MMAS is a scale, or a system, developed to measure patients’ medication adherence. This scale is based on eight simple questions on whether the patient sometimes forgets to take medication, as shown in “Table 2: The 8-Item Medication Adherence Scale” [6]. Patients are required to answer each question with a “yes” or “no.” Dr. Morisky argues in his 2008 article that he “phrased” the questions to avoid certain biases in patients’ answers [6]. The MMAS therefore contains some expression elements in terms of its phrasing of the questions, which may be eligible for copyright protection. However, the MMAS, as a system to assess patients’ medication adherence, may be protected better as a process (or business method) patent rather than as a copyright. Patent protection is subject to whether an invention meets substantive and procedural requirements under the patent laws of each jurisdiction.

Although the MMAS may have some expression value in terms of its phrasing of the questions, such protection is likely to be very thin. In other words, if another researcher rephrases the questions from his/her own perspective, and if such rephrased questions achieve a certain level of originality that does not infringe upon the “original expression” of the MMAS, then MRL may not be able to claim infringement of its copyright.

As mentioned above, Dr. Morisky stated in his article that he phrased the questions carefully to avoid the “yes-saying” bias [6]. If certain portions of the phrases in the questions are indispensable, then the so-called “merger doctrine” could apply. Under the merger doctrine, when an idea is effectively expressed in one or only a few ways, such expression(s) cannot be protected under the copyright law, because the idea and expression(s) are merged in this situation [7]. If other researchers have no choice but to use such essential phrases (i.e., expressions), copyright law would not protect such a merged term with an exclusive right. This is the crux of the idea-expression dichotomy under copyright law, which is instructive in the assessment of copyright cases.

When an article contains the MMAS as a whole (i.e., borrows the exact phrases or uses phrases that are substantially similar to the original), it may at least theoretically result in copyright infringement. As this is a thin protection, however,

one may avoid infringement claims by devising original expressions about the idea of measuring medication adherence.

### Question 2: Does academic use of such a scale really matter?

Even assuming that the MMAS is subject to copyright, meaning that authors using the MMAS cannot deny infringement itself, the authors can raise a “fair use” defense.

Fair use refers to any copying of copyrighted material done for a transformative purpose (i.e., creating new value) [7]. Criticisms, news reports, comments, book reviews, or parodies are typical examples of fair use. The quotation of short phrases and models, with valid citations, in scholarly articles is, of course, another valid form of fair use. However, whether the use of copyrighted material is actually fair use needs to be assessed carefully and on a case-by-case basis. For instance, copyright laws in the U.S. provide a guideline (four-factor test) in deciding the applicability of the fair use defense as follows [8]: the purpose and character of the use; the nature of the copyrighted work; the amount and substantiality of the portion taken; and the effect of the use upon the potential market.

In *MRL v U.C. Regents*, the Regents’ Counsel suggested that the fair use defense could be reasonably applied to this case under the United States Copyright Act. In its motions to dismiss the complaints, the defendant argued that the reproduction of the MMAS at issue was for research purposes only; that “simple factual questions” are less protected; that reproduction of only a part of the MMAS for scholarly purposes is fair use; and that the plaintiff’s argument of lost license (or lost revenue) is circular reasoning, because the defendant’s reproduction of the MMAS for research is protected as fair use [2].

## Points to Be Considered

### What if your team has not started its planned research?

Do not use MMAS at all. Try to find alternative measures. If the MMAS has any value as a system, attempt to rephrase the questions and restructure the system based on your own scholarly views. Journal editors and publishers may make it a rule not to use the MMAS at all and suggest alternative measures to avoid any friction with false intellectual property claims.

### What if your team has already published an article containing the MMAS without permission, and you received a warning letter from MRL?

If one does not have the time to deal with the issue, but has the requisite financial resources, then s/he may settle the dispute with a payment. However, it should be remembered that this is precisely the environment in which false claims are be-

coming more common. Of course, if the article clearly copied the MMAS as a whole (including its expression elements, which trigger thin protection), then the odds may be in favor of MRL. However, even if MMAS is reproduced as a whole, it is not the end of the game. Hopefully, an interpretation of copyright law regarding the MMAS will be provided by the courts. Nonetheless, the precedents are ample even now on fundamental copyright law issues such as which elements are required for copyright protection; when an idea and expression are merged; and how the fair use defense can set alleged infringers free from infringement claims.

### What if you are a journal editor and the authors of an article in your journal received a warning letter from MRL?

Journal editors and publishers, who have a genuine interest in policing devastating practices such as those promulgated with regard to the MMAS, may step up to ally with victimized authors and call false claimants to court seeking a declaratory judgment that there is no valid infringement claim of any intellectual property. Concerted action may be necessary to protect academic integrity and the public nature of scholarly works. False claimants have prospered in the present environment, partially thanks to the inaction of scholars or due to situations where scholars are under time pressure to meet deadlines for graduation or promotion.

### What if your team has already published an article mentioning the MMAS without use of the scale, and you received a warning letter from MRL?

MRL is believed to look for use of the MMAS regularly in medical literature databases. Upon finding this term in any journal, they probably commence by dispatching a threatening email to authors of that article accusing them of infringement of copyright law. However, just mentioning Dr. Morisky and/or the MMAS in the text does not by itself amount to copyright infringement. In this case, the authors and editors do not need to react to the threatening email; instead, they should ignore it. There will be no continuing contact from MRL. Another method to avoid interacting with them is to treat their threatening emails as spam. It is of course recommended that researchers and editors not mention this scale in the medical literature in any way. Without this scale, patients with hypertension - or any similar condition - can maintain their medication regimen without difficulty through physicians', pharmacists' or family members' assistance.

## Conclusion

This research provides evidence that medical researchers who

used Dr. Morisky's MMAS for their research did not in fact infringe any intellectual property rights, including the copyrights of MRL or Dr. Morisky. A simple comment on Dr. Morisky's work and a brief introduction of the MMAS does not constitute intellectual property infringement, either. In fact, the MMAS was made open to the public through Dr. Morisky's article via PMC [7]. Fair use of the MMAS in a scholarly article should not be barred by false copyright infringement claims. In many cases, Dr. Morisky and his team have claimed that authors applied the MMAS incorrectly and that their primary motivation for claiming intellectual property infringement is to correct such errors [1]. However, use of the MMAS has nothing to do with the treatment of patients, because MMAS is a measure to check how regularly and accurately patients take medication, rather than a tool for diagnosis or treatment.

Just introducing or describing the MMAS without a license in a research paper is not an infringement of any copyright. In conclusion, the authors would like to address the following three points that researchers should keep in mind. First, the MMAS is a system to measure medication adherence, rather than an original expression of authorship protected under copyright law. Second, even if there is room for copyright protection with regard to the phrasing of MMAS questions, such protection is thin, and the merger doctrine and fair use defense under copyright law may effectively defeat infringement claims. Third, researchers may be well-advised to behave with extreme caution to avoid using the MMAS and to seek out alternatives that are free from false claims, and journal publishers likewise may well advise their authors not to use the MMAS.

## Conflict of Interest

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

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# Compliance of education journals in Vietnam with the minimum criteria to be indexed in the ASEAN Citation Index and Scopus

Trung Tran<sup>1</sup>, Loc Thi My Nguyen<sup>2</sup>, Thanh Thi Nghiem<sup>2</sup>, Hien Thi Thu Le<sup>2</sup>,  
Cuong Huu Nguyen<sup>2</sup>, Thuy Phuong La<sup>2</sup>, Trung Tien Nguyen<sup>3</sup>, Hang Thi-Thu Nguyen<sup>4</sup>

<sup>1</sup>Vietnam Academy for Ethnic Minorities, Hanoi; <sup>2</sup>University of Education, Vietnam National University Hanoi, Hanoi; <sup>3</sup>Vietnam Journal of Education, Hanoi; <sup>4</sup>Thai Nguyen University of Agriculture and Forestry, Thai Nguyen, Vietnam

### Abstract

This study aimed at elucidating the present situation of scholarly journals published in Vietnam according to the minimum criteria to be indexed in the ASEAN Citation Index (ACI) and Scopus, with the goal of suggesting development strategies for scholarly journals in Vietnam. From the 387 journals accredited by the Vietnamese State Council for Professorship, 13 education journals were arbitrarily selected, and their compliance with the five minimum criteria for the ACI (peer review, timeliness, abstracts in English, references in Roman script, and a website in English) and the six minimum criteria for Scopus (peer review, timeline, abstracts in English, references in Roman characters, Electronic International Standard Serial Number [ISSN], and publication ethics) were assessed. Two of the 13 journals were eligible to be indexed in the ACI, while none fulfilled the minimum criteria to be indexed in Scopus. An urgent task for the editors of those journals is to establish an informative journal homepage in English that provides basic information on the journal. Then, an Electronic ISSN can be obtained from the ISSN International Center. Furthermore, the following steps are suggested for journal promotion: establishment of appropriate editorial policies and publication ethics procedures, improvement of research integrity, enhancement of the journals' reputation in the international scientific community, and improvement of the online publishing system by adopting a journal manuscript management system. To achieve those goals, financial support from the Vietnamese government will be invaluable.

### Keywords

Editorial policies; Vietnam; Peer review; Publications; Financial support

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**Correspondence to** Trung Tran  
trungt1978@gmail.com

### ORCID

Trung Tran  
<https://orcid.org/0000-0002-0459-7284>  
Loc Thi My Nguyen  
<https://orcid.org/0000-0002-7810-5262>  
Thanh Thi Nghiem  
<https://orcid.org/0000-0002-4516-9630>  
Hien Thi Thu Le  
<https://orcid.org/0000-0001-8847-6369>  
Cuong Huu Nguyen  
<https://orcid.org/0000-0002-6627-3824>  
Thuy Phuong La  
<https://orcid.org/0000-0002-8425-5144>  
Trung Tien Nguyen  
<https://orcid.org/0000-0002-3320-8962>  
Hang Thi-Thu Nguyen  
<https://orcid.org/0000-0003-2737-833X>

## Introduction

The improvement of scholarly journals published in Vietnam to meet international publication standards is in accordance with the Vietnamese government's guidelines and policies towards the development of scientific and technological capacities of higher education institutions. Furthermore, it is associated with trends in the promotion of the Vietnamese higher education system to the international level. However, despite efforts by the Vietnamese government and higher education institutions to improve the quality and quantity of scholarly journals, the status of journal publishing in Vietnam still remains under expectations. As of August 2018, there were 387 journals approved for inclusion in the list of accredited scholarly journals for consideration in promotion decisions for professors [1]. Only six of those journals (1.6%) were indexed in Scopus and/or the Emerging Sources Citation Index, including *Vietnam Journal of Mathematics*, *Acta Mathematica Vietnamica*, *Advances in Natural Sciences: Nanoscience and Nanotechnology*, *Advanced Materials and Devices Journal*, *Biomedical Research and Therapy*, and *Progress in Stem Cell*. As of June 2019, only 12 of the 387 (3.1%) Vietnamese accredited scholarly journals were indexed in the ASEAN Citation Index (ACI), as presented in Suppl. 1 [2]. Moreover, Vietnamese scholarly journals also face the following challenges in submission, editing, reviewing, and publishing: competition to recruit high-quality papers, finding international reviewers, low journal reputation (not indexed in Web of Science and/or Scopus), the need to reach a wider and larger readership, and meeting international standards for scholarly journal publications. This situation is quite similar to those of other ASEAN countries, such as the Philippines, as reported by Tecson-Mendoza in 2015 [3].

To find strategies for promoting scholarly journals in Vietnam to the international level, this study aimed to elucidate the status of scholarly journals in Vietnam. Of the 387 journals accredited by the Vietnamese State Council for Professorship, 13 education journals were arbitrarily selected. Those journals' websites and print versions were searched in order to determine whether they met the minimum selection criteria of the ACI and Scopus. According to the results, we would like to suggest long-term strategic solutions to improve scholarly journals in Vietnam, both in the education category and in other fields.

## What is the ACI?

According to the ACI Steering Committee [4], the new initiative of developing a central regional citation database was proposed at the fourth Meeting of Directors-General, Secre-

tary-General, Commissioner of Higher Education in Southeast Asia held in Jakarta, Indonesia in March 2010. The meeting stressed the importance of regional collaboration in establishing the ACI as a database to enhance research in Association of South East Asian Nations (ASEAN) countries and to increase the visibility of ASEAN research productivity [5].

Inspired by the Web of Science and/or Scopus, the mission of ACI is to become "a central regional database which was designed and set up to index all the bibliographic records and the citations of all quality ASEAN research outputs appeared in the ASEAN scholarly journals." The ACI's member countries include Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam. The ACI Steering Committee consists of 20 experts nominated by member countries to establish policies and oversee the implementation and development of ACI. The ACI Steering Committee conducts annual meetings to share experiences, monitor implementation, and evaluate and approve journals to be indexed in the ACI database. As of the end of June 2019, the ACI database consisted of a total of 587 scientific journals from countries in the ASEAN region [2]. To be indexed in the ACI, scientific journals published in the 10 ASEAN member countries must undergo a rigorous appraisal process according to the selection criteria developed by the ACI Steering Committee, including five pre-selection criteria and nine selection criteria [6].

## Compliance of Education Journals in Vietnam with the Five Pre-selection Criteria of the ACI

The keyword "education" was used to search 387 journals accredited by the Vietnamese State Council for Professorship. There were 13 journals that had the keyword "education" in their name (Table 1).

The content of the journal website and print version was searched. The five pre-selection criteria of the ACI are as follows [6,7]: peer review, timeliness of publication, abstracts in English, references in Roman script, and journal website in English. Two of the 13 selected education journals were eligible to be indexed in the ACI database (Table 2). Two journals had a journal homepage in English. For the other journals, it was difficult to verify the items for evaluation via their online resources only.

## Compliance of Education Journals in Vietnam with the Minimum Criteria to be Indexed in Scopus

According to the journal selection policy of Scopus [8], journal titles should meet all of the following minimum criteria to be considered for review: 1) consist of peer-reviewed content

**Table 1.** List of 13 education journals accredited by the Vietnamese State Council for Professorship (2018)

Journal title	pISSN	Publisher	Website URL address	Submission method
<i>Vietnam Journal of Education</i>	2354-0753	Vietnam Ministry of Education and Training	<a href="https://tapchigiaoduc.moet.gov.vn/en/">https://tapchigiaoduc.moet.gov.vn/en/</a>	E-mail
<i>VNU Journal of Science: Education Research</i>	0866-8612	Vietnam National University	<a href="https://js.vnu.edu.vn/ER/">https://js.vnu.edu.vn/ER/</a>	Open journal system
<i>Journal of Educational Sciences</i>	0866-3662	Vietnam Institute of Educational Sciences	<a href="https://jes.vnies.edu.vn/">https://jes.vnies.edu.vn/</a>	Self-constructed journal system
<i>Journal of Education Management</i>	1859-2910	National Academy of Education Management	<a href="https://jem.naem.edu.vn/">https://jem.naem.edu.vn/</a>	Self-constructed journal system
<i>Journal of Military Theory Education</i>	1859-056X	Political Academy: Vietnam Ministry of Defence	<a href="https://hocvienchintribqp.edu.vn/index.php/tap-chi-gdllctqs">https://hocvienchintribqp.edu.vn/index.php/tap-chi-gdllctqs</a>	E-mail
<i>NUAE Journal of Arts Education</i>	1859-4964	National University of Art Education	<a href="https://spntw.edu.vn/articles.aspx?sitepageid=715">https://spntw.edu.vn/articles.aspx?sitepageid=715</a>	E-mail
<i>Journal of Educational Equipments</i>	1859-0810	Vietnamese Association of Educational Equipments	<a href="https://www.vjol.info/index.php/TBGD/index">https://www.vjol.info/index.php/TBGD/index</a>	Open journal system
<i>Journal of Education and Society</i>	1859-3917	Association of Vietnam Universities and Colleges	<a href="https://giaoducvaxahoi.vn/">https://giaoducvaxahoi.vn/</a>	E-mail
<i>Journal of Science and Education</i>	1859-1612	Hue University's College of Education	<a href="https://tckhgd.huce.vn/">https://tckhgd.huce.vn/</a>	E-mail
<i>Journal of Technical Education Science</i>	1859-1272	Ho Chi Minh City University of Technical Education	<a href="https://tapchikhgdkhcmute.edu.vn/">https://tapchikhgdkhcmute.edu.vn/</a>	E-mail
<i>Journal of Educational Management Science</i>	2354-0788	The Ho Chi Minh City School of Education Management	<a href="https://iemh.edu.vn/cm_gioi-thieu-tap-chi.html">https://iemh.edu.vn/cm_gioi-thieu-tap-chi.html</a>	E-mail
<i>Journal of Science and Education</i>	1859-4603	University of Science and Education, University of Da Nang	<a href="https://ued.udn.vn/page/tap-chi-khoa-hoc.html">https://ued.udn.vn/page/tap-chi-khoa-hoc.html</a>	Self-constructed journal system
<i>Journal of Vocational Education and Training</i>	2354-0583	Directorate of Vocational Education, Vietnamese Ministry of Labour, Invalids and Social Affairs	<a href="https://jvet.org.vn/index.php/jvet">https://jvet.org.vn/index.php/jvet</a>	Open journal system

pISSN, print International Standard Serial Number.

and have a publicly available description of the peer review process; 2) be published on a regular basis and have an International Standard Serial Number (ISSN) as registered with the ISSN International Centre; 3) have content that is relevant for and readable by an international audience, meaning: have references in Roman script and have English language abstracts and titles; and 4) have a publicly available publication ethics and publication malpractice statement.

The results of the analysis of the 13 journals is summarized in Table 3. None of the 13 journals fulfilled the minimum selection criteria to be considered for review and evaluation for Scopus inclusion. One journal had an eISSN that could be confirmed through the ISSN portal (<https://portal.issn.org>). One journal mentioned publication ethics on the journal homepage. No journals provided a full statement about publication ethics and a statement about the use of anti-plagiarism software systems.

### What Should Vietnamese Editors Do to Promote Their Journals to the International Level?

The above-described situation of the 13 journals reveals that they should take steps to reach the minimum standards of scholarly journals. To fulfil the minimum standards listed in the ACI and Scopus selection process, there should be an informative journal homepage in English that provides the journal title, publisher, aims and scope, editorial board, instructions for authors, publication ethics, contact address, archiving sites, and full-text content of articles including the title, year, volume, page, authors' names, and authors' affiliations. After constructing a journal homepage in English with an independent domain, the editor or publisher should obtain an eISSN from the ISSN International Center through the National Library of Vietnam. Although this is a difficult and

**Table 2.** Compliance of 13 education journals in Vietnam with the minimum criteria of the ASEAN Citation Index

Journal title	Peer review	Timeliness	Abstracts in English	References in Roman script	Website in English
<i>Vietnam Journal of Education</i>	Yes	Yes	Yes	Yes	Yes
<i>VNU Journal of Science: Education Research</i>	Yes	Yes	Yes	Yes	Yes
<i>Journal of Educational Sciences</i>	Yes	Yes	Yes	Yes	No
<i>Journal of Education Management</i>	Yes	Yes	Yes	Yes	No
<i>Journal of Military Theory Education</i>	Yes	Yes	No	Yes	No
<i>NUAE Journal of Arts Education</i>	Yes	Yes	Yes	Yes	No
<i>Journal of Educational Equipments</i>	Yes	Yes	Yes	Yes	No
<i>Journal of Education and Society</i>	No <sup>a)</sup>	Yes	Yes	Yes	No
<i>Journal of Science and Education</i> (Hue University's College of Education)	Yes	Yes	Yes	Yes	No
<i>Journal of Technical Education Science</i>	Yes	Yes	Yes	Yes	No
<i>Journal of Educational Management Science</i>	Yes	Yes	Yes	Yes	No
<i>Journal of Science and Education</i> (University of Danang, University of Education)	Yes	Yes	Yes	Yes	No
<i>Journal of Vocational Education and Training</i>	Yes	Yes	Yes	Yes	No

<sup>a)</sup>Some of the manuscripts are reviewed by the editorial board.

**Table 3.** Compliance of 13 education journals in Vietnam with the minimal criteria to be indexed in Scopus

Journal title	Peer-review description	Timeline	eISSN	Title and abstract in English	Reference in Roman characters	Publication ethics
<i>Vietnam Journal of Education</i>	Yes	Yes	No	Yes	Yes	No <sup>b)</sup>
<i>VNU Journal of Science: Education Research</i>	Yes	Yes	2588-1094	Yes	Yes	Yes
<i>Journal of Educational Sciences</i>	Yes	Yes	No	Yes	Yes	No <sup>b)</sup>
<i>Journal of Education Management</i>	Yes	Yes	No	Yes	Yes	No <sup>b)</sup>
<i>Journal of Military Theory Education</i>	Yes	Yes	No	No	Yes	No <sup>b)</sup>
<i>NUAE Journal of Arts Education</i>	Yes	Yes	No	Yes	Yes	No <sup>b)</sup>
<i>Journal of Educational Equipments</i>	Yes	Yes	No	Yes	Yes	No <sup>b)</sup>
<i>Journal of Education and Society</i>	No <sup>a)</sup>	Yes	No	Yes	Yes	No <sup>b)</sup>
<i>Journal of Science and Education</i> (Hue University's College of Education)	Yes	Yes	No	Yes	Yes	No <sup>b)</sup>
<i>Journal of Technical Education Science</i>	Yes	Yes	No	Yes	Yes	No <sup>b)</sup>
<i>Journal of Educational Management Science</i>	Yes	Yes	No	Yes	Yes	No <sup>b)</sup>
<i>Journal of Science and Education</i> (The University of Danang, University of Education)	Yes	Yes	No	Yes	Yes	No <sup>b)</sup>
<i>Journal of Vocational Education and Training</i>	Yes	Yes	No	Yes	Yes	No <sup>b)</sup>

eISSN, electronic International Standard Serial Number.

<sup>a)</sup>Some of the manuscripts are reviewed by the editorial board; <sup>b)</sup>There was no statement about the use of software in ensuring publication ethics, but there was a statement of compliance with publication ethics in the printed version or on the website.

challenging process that requires long-term and persistent efforts and appropriate investment in financial and human re-

sources, journal editors should have a long-term strategy for improvement.

**Table 4.** List of non-commercial open source publishing platforms

System	Provider	Website
Open Journal System	Public Knowledge Foundation	<a href="https://pkp.sfu.ca/ojs/">https://pkp.sfu.ca/ojs/</a>
DPubS	Cornell University Library, USA	<a href="http://dpubs.org">http://dpubs.org</a>
Digital Commons	Bepress	<a href="https://www.bepress.com/products/digital-commons/features/journal-publishing/">https://www.bepress.com/products/digital-commons/features/journal-publishing/</a>

The following specific solutions are suggested. First, the journals’ editorial policies and publication ethics should be established according to international standards in terms of the style and format of manuscripts, editorial policy, review process, and publication ethics policies. A more efficient way to describe the above items is that journals should follow the “principles of transparency and best practice in scholarly publishing, third version” [9]. These principles will also help editors to ensure that appropriate processes are in place to deal with any kinds of publication misconduct.

Second, the research integrity of articles should be improved. One method to maintain research integrity is to use plagiarism detection software.

Third, steps should be taken to enhance the journals’ reputation in the international scientific community. More specifically, the journals need to be developed from locally recognized journals to internationally recognized journals by establishing partnerships with experts and editors from other countries.

Fourth, online publishing should be improved by adopting a manuscript management system to receive submissions and to manage manuscripts during the review process. Taking into consideration the current financial capacity of scholarly journals in Vietnam, a feasible solution would be to use one of the open-source platforms for manuscript submission and publishing listed in Table 4.

## Conclusion

To elucidate the present situation of scholarly journals in Vietnam, 13 education journals were selected for their eligibility to be indexed in the ACI and Scopus. Two of them were eligible to be indexed in the ACI, while none of them fulfilled the minimum criteria for both databases. Promotion of those journals to the international level, at which they would be eligible to be indexed in international literature databases, is an urgent task for the journal editors. Given the rapid economic developments and scientific achievements in Vietnam, there is the possibility that scholarly journals in Vietnam will be able to reach the level of first-rate international journals in the near future. To hasten this process, it is suggested that the Vietnamese government and other stakeholders should im-

plement priority-based policy interventions and provide financial support to help scholarly journals in Vietnam to achieve internationalization.

Vietnamese journal editors should pay more attention to constructing journal homepages in English with independent domains, building or using manuscript management systems, and using tools to detect plagiarism to maintain publication ethics more efficiently.

## Conflict of Interest

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

## Supplementary Material

Supplementary file is available from the Harvard Dataverse at: <https://doi.org/10.7910/DVN/B0A68W>.

**Suppl. 1.** List of 12 journals indexed in the ASEAN Citation Index, out of the 387 Vietnamese accredited scholarly journals.

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# Establishment of the Indonesian Association of Scientific Journal Editors

Komang G. Wiryawan

Faculty of Animal Science, Bogor Agricultural University, Bogor, Indonesia

## Introduction

A performance indicator for a country's research activity is the number of international publications in good quality and reputable international journals. Such publications in highly-reputable international journals are indicators of high-quality research and high-quality human resources in terms of science and technology innovation. One way to increase the number of publications in international journals is to promote target journals with high-quality articles. In order to be recognized as a good international journal, it should be registered in reputable international indexing organizations such as Scopus, Web of Science, PubMed, Directory of Open Access Journals (DOAJ), and EBSCO.

While Indonesia has more than 14,000 scientific journals [1], only a few journals are indexed in international databases. Up to 2019, Scopus indexes 49 Indonesian scientific journal titles [2], the Clarivate Analytics master journal list indexes 63, and DOAJ indexes 1,358. Those figures show that the majority of Indonesian scientific journals need improvement in order to be recognized as good quality international journals for acceptance by international indexes.

The Indonesian government has provided some support and policies to improve the quality of journals in the country. In the late 1990s, the Indonesian government introduced an accreditation system for national journals that aimed to improve journal management and quality. In the late 2000s, that measure was followed by the journals' internationalization policy for accredited publications [3]. The government provides grants for journal editors for the preparation of accreditation and internationalization, as well as workshops and assistance for both programs. Yet the sheer volume of journals in Indonesia means that the government is unable to assist them all. Therefore, the establishment of the Indonesian Association of Scientific Journal Editors (IASJE) is a necessary step to support government programs aimed at improving journal quality in Indonesia.

## Overview of IASJE

IASJE is a non-government, non-partisan, and non-profit organization. As its main objective is to improve the capacity of journal editors in Indonesia with regards to journal management and manuscript handling, the organization is consequently expected to improve journal quality. High-quality journals are expected to contribute to advances in science and technology, as well

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**Correspondence to**  
Komang G. Wiryawan  
[kgwiryawan@ipb.ac.id](mailto:kgwiryawan@ipb.ac.id)

**ORCID**  
Komang G. Wiryawan  
<https://orcid.org/0000-0002-0593-9653>

as human welfare as a whole.

IASJE was established on January 26, 2018 in Bogor, Indonesia during the First Indonesian Editors Congress (Figs. 1, 2). This event was attended by 50 journal editors from various institutions (universities; research and development of agriculture, ministry of agriculture; research and development of health, ministry of health; research and development of fisheries, ministry of marine affairs and fisheries; and delegation of the ministry of research, technology, and higher education). The congress was officially opened by the Vice Rector of Bogor Agricultural University, Bogor, Indonesia. The congress also discussed IASJE's statutes and by-laws, organizational structure, and programs.

### Vision, Mission, and Objectives

IASJE's vision is to become an organization that contributes to the development and dissemination of science, technology, and arts in Indonesia. While its mission is to improve the quality and visibility of Indonesian scientific journals, as well as to disseminate and promote Indonesian journals at the international level.

IASJE's objectives are to improve the ability of journal editors in handling a journal; to improve the quality of Indonesian journals through sharing information with regards to manuscript handling and publication; to increase the visibility of Indonesian journals at the national, regional, and international levels; and to facilitate collaboration, communication, and information exchange with other organizations both at the national, regional, and international levels, and amongst IASJE members.

### Organizational Structure

In order to accommodate IASJE's objectives, the organizational structure comprises an Advisory Board and Executive Board (Fig. 3). Advisory Board members have been selected to represent various institutions. The Executive Board consists of a president, secretary general, two vice-presidents, treasurer, and four committees. The first vice-president coordinates two of the committees (Education & Training, Publication Ethics), while the second vice-president coordinates the other two (Publication & Information, Collaboration). The president is

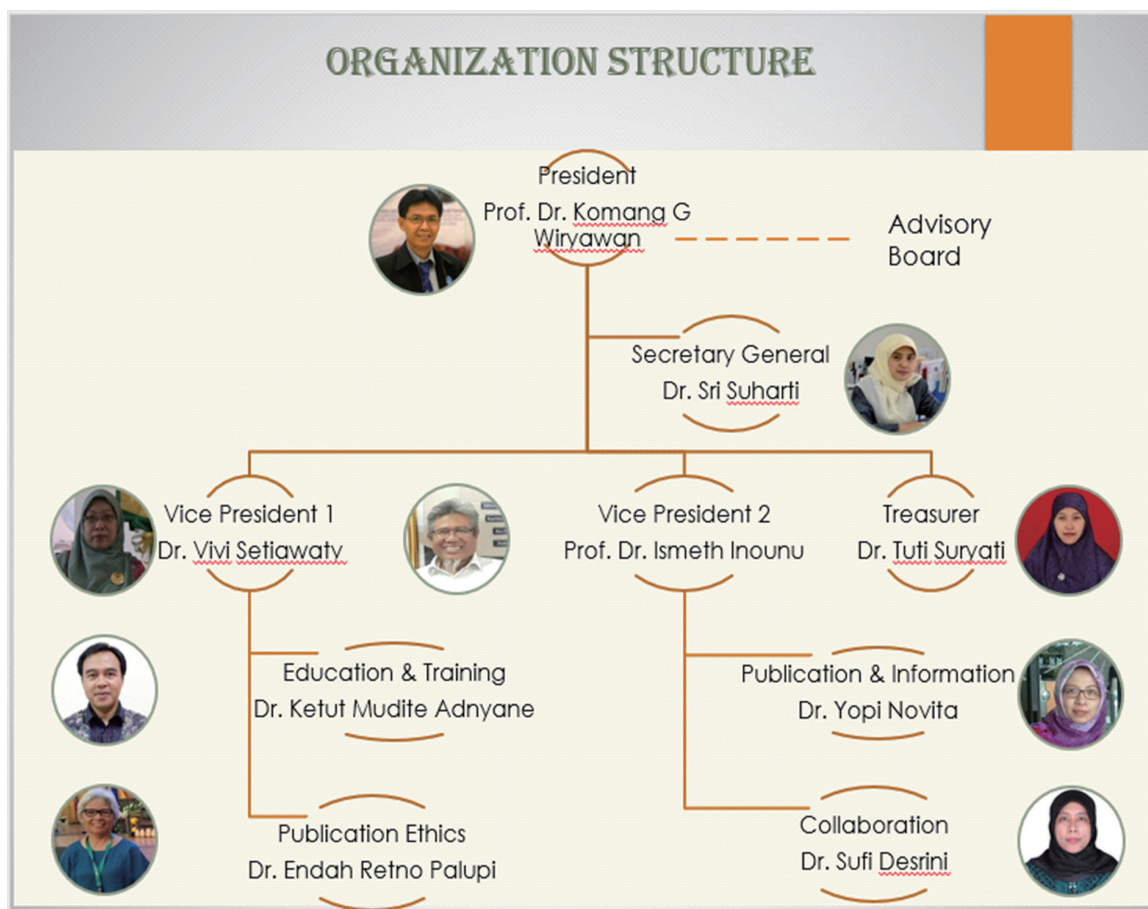


Fig. 1. Organizational structure of the Indonesian Association of Scientific Journal Editors.



**Fig. 2.** Appointment of the president of the Indonesian Association of Scientific Journal Editors.



**Fig. 3.** Participants of the first Indonesian editors congress for the establishment of the Indonesian Association of Scientific Journal Editors.

ected during the Congress for a 2-year term, and can be re-elected for a second term. Executive board members come from various institutions such as universities, the ministry of agriculture, and the ministry of health. Each committee has five-to-ten members selected from different institutions.

## Programs

Each committee has its own programs. The programs for Education & Training are managing workshop/training activity related to manuscript review, manuscript editing, and the annual conference; providing standards and formats for manuscript editing; and establishing a certification system for journal editors.

The programs for Publication Ethics are planning and managing workshops on the standard of publication ethics in journal management; evaluating the practice of publication ethics; and resolving problems related to publication ethics misconduct by IASJE members.

Programs for Publication and Information are to organize the publication of a newsletter; to manage the IASJE website, and to disseminate all programs and activities of IASJE to all members.

Programs for Collaboration are to manage collaboration with scientific associations and academic institutions at the national, regional, and international levels; and to manage collaboration between IASJE members.

## Conclusion

Establishing the IASJE is a challenging task. Effort is needed

to persuade other journal editors and related institutions of the organization's benefits in terms of the development of scientific journals in Indonesia. Government support is also important, as IASJE's establishment mainly aims to support government programs in improving the quality of Indonesian journals. Strong cooperation between IASJE and the government over time will achieve a stronger impact and accelerate the improvement of journal quality in Indonesia.

## Conflict of Interest

Komang G. Wiryawan serves as an editor of the *Science Editing*, but has no role in the decision to publish this article. Except for that, no potential conflict of interest relevant to this article has been reported.

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# Self-promotions and advertising: are they a common practice for boosting altmetric scores?

Sai Krishna Gudi<sup>1</sup>, Swarna Priya Basker<sup>2</sup>

<sup>1</sup>College of Pharmacy, Rady Faculty of Health Sciences, University of Manitoba, Winnipeg, MB, Canada; <sup>2</sup>Jaya College of Pharmacy, Chennai, India

## Introduction

In the era of internet and social media, the modes of publishing, sharing, searching, and reading scientific research are evolving, as the ultimate goal of any research is to be discoverable to the target audience. Altmetrics is a form of qualitative data that are complementary to traditional, citation-based metrics, which deal with journal articles and other scholarly outputs being discussed worldwide [1]. In recent times, altmetrics has gained reputation and popularity as it offers a quicker way to demonstrate the potential impact of one's scholarly work and its public engagement. Although enhancing research impact and gaining visibility are essential from a researcher's viewpoint, self-advertising should be prudent and appropriate. Through this essay, we intend to discuss on how self-promotions and advertising play an active role in driving altmetric scores.

## Definition of Altmetrics

The term altmetrics is derived from the terms 'alternative' and 'metrics,' and measures the interactions among researchers, academicians, scholars, and scientists that are captured by social media such as Facebook, Twitter, LinkedIn, and blogs, and by specific reference management tools such as Mendeley [1]. Typically, for an article-level metrics, a multi-colored altmetric donut badge icon is found alongside each article with a number at the center. This number is denoted as the Altmetric Attention Score or Altmetric Score (AS) for the article [2]. AS was first developed and established by Euan Adie in 2010 and came into use in the United States, United Kingdom, Germany, and Australia in 2012 [3]. Traditionally, research capability and intelligence were measured using citation-based metrics; however, as citations cannot provide information on downloads, mentions, and shares, which have come into existence after the development and evolution of the Web, AS came into action.

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**Correspondence to** Sai Krishna Gudi  
[gudisk@myumanitoba.ca](mailto:gudisk@myumanitoba.ca)

### ORCID

Sai Krishna Gudi

<https://orcid.org/0000-0001-9576-9207>

Swarna Priya Basker

<https://orcid.org/0000-0002-1877-3808>

## Functions of AS

Traditional scholarly metrics such as journal impact factor (JIF) are often used as an evaluation tool to appraise publications of individual researchers. Citations are the established metric for impact evaluation and are more meaningful than the metrics of the journal [4]. Further, the h-index is a popular metric to quantify an individual's scientific research output. However, AS can track the number of views, downloads, bookmarks, shares, and mentions of a published paper in policy documents, press releases, news outlets, and references in Wikipedia [5]. Thus, these scores have become undoubtedly crucial to researchers given that they measure dissemination, and act as an indicator of influence and impact of their published scholarly work. AS considers and measures various parameters such as individual collaboration, international collaboration, institution impact, JIF, journal open accessibility, and field type when generating scores [6].

The ultimate goal of any research is to promote and showcase the findings to reach the target audience, which could, in turn, enhance the reputation and career progression of a researcher. Online media channels, including blogging sites and the mass social media networks such as Twitter, have soon become essential communication channels for scientists to generate and discuss ideas, find collaborators, and disseminate research both within their communities and to the general public [7]. As AS's provide an initial and immediate assessment of a research article's future scholarly impact, researchers are inclined toward social media, which is freely available and convenient for engagement. However, the citations of an article cannot be predicted based on AS. The number of times an article is discussed on the altmetric platform is an essential indicator of its impact and contribution to the research world. AS is useful to rank research outputs based on attention gained by that particular article; however, it cannot estimate anything about research quality [8]. Promoting research on social media can play a vital role in gaining visibility, which eventually may improve AS, and thus gain a more diverse impact than that achieved by citation-based metrics; further, it may analyze the societal impact of certain scholarly publications. However, AS is relatively new and more research is required for their use. Even when a publication lacks citations, AS can act as a potential measure of the value of research outputs, thereby providing an independent assessment of research engagement with the public and their feedback. However articles can sometimes receive online attention for the wrong reasons. For example, if an article contains flaws or any surrounding controversies and is then discussed on social media, the article would still receive a high AS for inaccurate work. Moreover, discussions and mentions can be purchased

to increase a paper's AS, and publishers could also collaborate with specific news agencies to increase the coverage of their research articles by the mainstream media [9].

## Ways to Publicize Scholarly Work

Social media enables one to share ideas and receive an immediate response to the sharing activities. Because of its quick response and efficiency, it has attracted the attention of the scientific community in parallel to the traditional forms of scholarly communication. With the presence of social media, newer articles have an inherent advantage of having a higher AS over older ones. There are different ways in which individuals can publicize their work online, e.g., tweeting, which is the most significant contributor to altmetrics, posting on Facebook and LinkedIn, blogging, and adding references of published works to Wikipedia and other public information platforms [10]. At times, even journals promote their published articles on social media for greater outreach, engagement and improved dissemination. Nowadays, a formal publication of scholarly work in a peer-reviewed journal is not considered to be the final step, and publicizing and promoting the published work, which are potentially beneficial to the target population, science community, and the broader society, are treated to be equally important. The tools under the umbrella of altmetrics allow researchers to move out from the traditional closed system to the open Web to share their ideas and findings; receive comments; and get their research referenced and peer-reviewed from a wide range of diversified users. However, not everyone will encourage such promotions and respond positively to it. Moreover, these may also create unwanted noise on the Web.

## Complementary Roles of Altmetrics to Bibliometrics

From a recent survey, there are approximately 10.9 million mentions of new stories till date in the metadata of journals, and a majority of the attention was noticed after the emergence of AS (i.e., after 2012), which represents an increase in self-promotions of research on social media [3]. Presence of a positive correlation between social media mentions and future citations suggest that online activity may anticipate the traditional measure of scholarly impact [6]. Thus, AS and online activity have the potential to boost future citation rates. However, altmetrics are a complement to, and not a replacement for, factors like informed peer review and citation-based metrics [11]. Findings from a recent study suggest that in countries with limited access to the internet and social media services, the utility and reach of altmetrics may be limited, indicating a clear-cut dependence of AS on social media [12].

As a young discipline, altmetrics is quickly changing the dynamics and incentives of scholarly communication and scientific publishing. However, it should not replace traditional bibliometrics (citations, JIF, and h-index), but rather supplement them. Criticizing and discussing a quality research is important, rather than boosting AS's. Although self-promotions and advertising on social-media are linked with the high AS's and citation rates, researchers should act prudently and appropriately when publicizing their scholarly work to avoid unwanted noise on the web.

## Conclusion

Through all these explorations, it is evident that social media has a definitive impact on AS promotion, which is, in fact, a common approach of most researchers to uphold their reputation. However, we must wait and watch how this association between social media and article metrics changes scholarly communication and science itself in the near future.

## Conflict of Interest

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

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## Promoting scholarly journals internationally: Russian editors and publishers' passion

Hyungsun Kim

Department of Materials Science & Engineering, Inha University, Incheon, Korea

Event: The 8th International Scientific and Practical Conference: "World-Class Scientific Publication 2019: Strategy and Tactics of Management and Development"

Date: April 23–26, 2019

Venue: Assembly Hall of the Mining Institute, Moscow, Russia

Organizer: Association of Science Editors and Publishers, Russia; National University of Science and Technology, Russia

URL: <https://conf.rasep.ru/wcsp/wcsp2019>

I was invited by Dr. Olga V. Kirillova, president of Russia's Association of Science Editors and Publishers (ASEP), to attend the association's conference in Moscow, held April 23–26. This annual conference is known as the largest and most authoritative event for developing the publishing industry in Russia's science and education sector through world-class scientific journals. The conference focuses on the current status and prospects for development of scientific journals in Russia, Commonwealth of Independent States, and Eastern Europe. It aims to develop tactics for publishing-related activities in various scientific fields, and to support, develop and promote the association's member journals and publications, strategizing to realize this goal. About 400 participants attended: experts directly involved in the publication of scientific journals, representatives of universities and the Russian Academy of Sciences, the Federal Science Center, and others from across the publishing industry (Fig. 1).

On April 22, the day prior to the conference, a *Scopus Only Day* comprised an international workshop presented by the Scopus team of Elsevier, with about 100 people attending. In the morning, Scopus introduced and discussed the latest trends with sessions on "How to get your title accepted into Scopus" and the "Russian board: an inside look into their ways of working." In the afternoon, a working group session examined submitting journals to Scopus for pre-evaluation and potential indexing in their database, highlighting a recent Scopus resource (<https://www.readyforscopus.com/>).

On the morning of April 23, there was an opening ceremony and eleven keynote speeches of fifteen minutes each. Two of the talks were particularly impressive: "Open access: a view from the EU," and "Economic feasibility of transferring to open access the Russian articles published under the support of the Russian Foundation Ministry of Science and the Russian Foundation for Basic Research." In the afternoon, we discussed the problems and improvements of

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**Correspondence to** Hyungsun Kim  
[kimhs@inha.ac.kr](mailto:kimhs@inha.ac.kr)

**ORCID**

Hyungsun Kim

<https://orcid.org/0000-0003-1499-8484>





**Fig. 1.** Participants at the conference, with me at far left. Fourth from the left is Dr. Olga V. Kirillova, conference organizer and President of Association of Science Editors and Publishers; next from left, Dr. Pippa Smart, European Association of Science Editors President. Second from right is Dr. Ksenija Baždarić, Editor in Chief, European Science Editing.

Russian scientific journals through the “State programme aimed at support and development of journals as part of the national project ‘Science’: directions, accents, solutions.”

On April 24, the presentations were organized in two concurrent series, the main one addressing “Management of the editorial process and publication of a scientific journal: strategy, tactics,” and “Ethical problems of the publication process: practice of solutions and the theory of overcoming.” The Q&A session was lively. I was especially interested in digital utilization services, such as the introduction of DOI, online contribution/review systems, and the number of citations, in Russia. In the afternoon, there was a workshop hosted by Ms. Pippa Smart, chair of the European Association of Science Editors. The specialist topic of international standards in ethics and reviewing was introduced under the title, “How to improve the quality of a journal: ethics, reviewing, international publishing standards, promotion, development.”

In the next session, from 16:45 to 18:00, at a “Round table of the chief and senior editors of international journals for editors: Sharing experiences, discussing current trends,” editors and related persons representing four journals (*Learned Publishing*, *European Science Editing*, *Science Editing*, and the *Scientific Editor and Publisher*) discussed the publishing experience of their journals. I introduced *Science Editing*, published by the Korean Council of Science Editors. The audience applauded the rapid development of *Science Editing*, indexed in Scopus and ESCI, having started in 2014.

The second concurrent series covered “Near and distant prospects for indexing Russian journals and publications in Scopus,” where the Scopus team presented topics from the *Scopus Only Day* for editors who had not attended. The first three presentations specifically related to “The impact of Scopus: main results of 2018, road map of 2019 and the effect of inclusion in Scopus,” “How to achieve inclusion in Scopus,” and “Re-evaluation of journals in Scopus.”

In the session on “Editorial policy, review and selection of materials for publication,” Liliya K. Raitskaya spoke on “Peer review in Russia: socio-cultural specifics and barriers (based on a survey of participants in the editorial process).” She mentioned that peer reviews cannot be objective in their evaluation of papers because of the high-context Eastern culture of Russia. According to her discussion of the research results, some reviewers believe that relationship is more important than law, and especially relationship to one’s circle and leaders. In addition, she added that this is a situation where good papers cannot be published.

As an invited talk, I presented a fifty-minute workshop for editors and publishers, on “How to make your journal highly cited in the Web of Science and Scopus databases.” Concerning strategy for improving journals, I explained that journal management should be scrutinized in terms of editing (submission, review) and citation management. I also introduced the “Golden rules for scholarly journal editors,” from *European Science Editing* [1].

On April 25, the sessions were divided into three groups. The first group covered “open science” addressing open access and scientific ethics, global registries of open access works and copyright reform, and aggregate data on scientists from open-source materials. Like Elsevier with Scopus, Clarivate Analytics conducted an independent session, regarding their “Web of Science resource development: new services and solutions for journals and publications.”

In the afternoon, the Association of Experts on Academic Writing’s National Consortium of Writing Centers opened their workshop, “How to perform the task of improving the quality of scientific publications in English.” The first of two speakers, Robert Jensky, gave an interesting talk entitled “A journey through time: musings on the past, present and future of academic paper writing.” Next, it was my turn to discuss a question: “Which paper is well written?” I made a lecture on how to write introductions and sections regarding methods, results, discussions, conclusions, as well as abstracts and titles in science, technology, and medicine (STM) journals.

One of the other groups of sessions was for Russian editors and publishers only. The first assessed the current state of scientometrics and bibliometrics for evaluating scientific publications, and the second considered whether there are any prospects for international recognition in the development of journals of social sciences, humanities or law. The third of these sessions considered classification systems and information support for science. On the 26th, the conference concluded with the ASEP general meeting and a closing ceremony.

The purpose of this conference, under the banner of management and development strategies and tactics, was to promote world-class science and technology publications by improving the impact of Russian domestic journals. The keynote

speakers emphasized global conditions for the popularization of Russian science and technology, and for innovation in these fields, as well as how to make a world-class journal. Although this conference was originally intended for STM journals, many people from the humanities and social sciences also attended. All participants received a 146-page Russian translation of Pippa Smart’s *Handbook for Journal Editors*. The attendees seemed pleased to receive this “textbook” for editors.

Considering that most of the participants were Russian, eleven of the sixteen sessions featured simultaneous English-Russian interpretation: overall, the participants were from the EU, UK, and USA, as well as Hong Kong and Korea. Many audience members shared empathy at the session, concerning the current trends in electronic publishing processes and platform development for scientific publishing and journal promotion. It was an opportunity for me to see Russian editors and publishers trying to adjust while considering internal and external factors to improve the quality of their academic journals. I felt that the enthusiasm of the Russian editors attending this conference was no different from what we find among Korean editors.

## Conflict of Interest

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

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## Issues advocated at 2019 annual meeting of the Council of Science Editors

Cheol-Heui Yun

Department of Agricultural Biotechnology and Research Institute for Agriculture and Life Sciences, Seoul National University, Seoul, Korea

Date: May 4–9, 2019

Venue: Hyatt Regency Columbus, Columbus, OH, USA

Organizer: Council of Science Editors

The 2019 annual meeting of the Council of Science Editors (CSE; Anna Jester, President) was held in Columbus, Ohio (May 4–9, 2019) with the theme and catch-phrase, ‘the spirit of scientific publishing: inclusion, identity, technology & beyond.’ Prior to the annual conference, there were one- and two-day short courses to provide editors and publication managers the opportunity to understand and collaborate on effective solutions for current and upcoming challenges. At the 2019 CSE annual meeting, the keynote address was given by Marjorie M. K. Hlava (President of Access Innovations, Inc.), and the plenary talk was given by Bernadette Melnyk (Vice President for Health Promotion, University Chief Wellness Officer, Dean of the College of Nursing, Ohio State University). Interesting sessions during the two-day meeting included General Data Protection Regulation (GDPR); Preprint submissions to journals: what’s your policy; Manuscript Exchange Common Approach (MECA); and Creating and implementing a data policy among others.

Followings are the contents of the annual meeting in detail. The meeting was composed of short courses (May 4–5, 2019) and the CSE 2019 annual meeting (May 6–7, 2019). At the short courses just prior to the annual conference, there was a 1-day course for Advanced Publication Management. The publication management short course was a workshop for managing editors, production editors, and publication managers where they learned about up-to-date issues and had the opportunity to collaborate on effective solutions for current and upcoming challenges. The 2-day journal editors short course, designed for editors-in-chief and editorial members, was also offered. This course consisted of a comprehensive lecture and discussion of their roles and responsibilities (Fig. 1).

At the journal editors short course, David Crotty (Oxford University Press) suggested that while open access (OA) has advanced greatly and reached a new era of implementation, it is still in an evolutionary phase. He added that OA should indicate ‘access and re-use’ rather than ‘open for the public.’ He also compared and contrasted business models for publication including gold, green, and diamond/platinum OA.

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**Correspondence to** Cheol-Heui Yun  
cyun@snu.ac.kr

**ORCID**

Cheol-Heui Yun  
<https://orcid.org/0000-0002-0041-2887>



**Fig. 1.** Participants at journal editors short course, the 2019 annual meeting of the Council of Science Editors (Cheol-Heui Yun, the author, second from the right in the first row).

Briefly, problems and limitations with gold OA are as follows: author-centric rather than reader-centric, economic pressures to publish more rather than focusing on quality, cost often reduced by removing reader services, scale-dependent, artificially low article processing charge (i.e., average cost should not be assumed as the right price of all journals), productive institutes (e.g., some universities) that pay a lot more (e.g., the University of California spent about 35 million US dollars and would need about 75 million US dollars to move to gold OA), shifts of the point of inequity from readers to the authors, phenomena that rich publishers get richer, possibility of disappearance of new journals and publishers in developing countries, and quality issues.

Problems and limitations with green OA are as follows: default embargo period of 12 months, wide variance of article half-life, different stakeholders with different needs, citation confusion due to versioning, and question of real OA.

Problems and limitations with diamond/platinum OA are as follows: unclearness on what to do when funds run out,

easiness to make a new OA, and hardness to maintain the publication.

After the session, I noticed that OA should not be confused with mega journal approaches and predatory journals. There are also new models of OA such as the consortia model, the subscribe to open model, and the bronze OA model.

One of the most popular sets of licenses developed by Creative Commons (CC), a non-profit organization, in conjunction with OA, has focused on making creative works available for discovery and reuse. At the discussion, the reasons why CC BY-NC (Attribution-NonCommercial) and CC BY-ND (Attribution-NoDerivatives) have advantages over CC BY (Attribution) was discussed. Although it is an author's choice and preference of which type to use, CC BY-NC and CC BY-ND are argued to be preferable because they protect author reputation and integrity of research, protect from unsavory commercial exploitation, protect intellectual property, provide licensing revenues, which reduce the financial burden, and provide a potential solution to the free-rider problem. It was

noted that this issue might not be of high interest to authors as it would be a low priority for most of them.

According to Wikipedia, “Plan S is an initiative for open-access science publishing that was launched by Science Europe on September 4, 2018. It is an initiative of ‘cOAlition S’, a consortium launched by major national research agencies and funders from twelve European countries. The plan requires scientists and researchers who benefit from state-funded research organizations and institutions to publish their work in open repositories or in journals that are available to all by 2020. The S stands for shock” [1]. Plan S in relation to OA was discussed based on various facts. National and international students tend to come to the famous lab in the area of interest where the principal investigator publishes in high impact factor journals. Plan S will not be supported by the US government. Chinese government welcomes Plan S, although there is no indication yet of its adoption since Chinese researchers like high impact factor journals regardless of the status of OA. Future directions for OA will include the following. The concept and mission statement of OA will be a valuable tool for societies. It must be carefully applied in a sustainable and responsible manner and there is still no perfect route. There are different approaches for different outcomes and no authors should be left behind.

I must say that OA is still just one of the models—not the answer or solution. Also, too much money is required regardless of the source for article processing charge. However, the direction suggested by OA is not incorrect, and yet the weight on how long it will take to gain a foothold will be different from country to country. It is seemingly true that we will get all this information not via libraries, with the result that there will be fewer libraries; otherwise, the role of the library will need to change.

Next, the peer review system was reviewed by Anne Coghill, a peer review analyst at the American Chemical Society (ACS). As we know, there is traditionally a single, double, and triple peer review system, and rather recently, the open peer review system has been introduced for its transparency. We also know that each model has merits and drawbacks. Ms. Coghill mentioned that ACS has not yet decided to transform from single peer review to other forms because of uncertainty. Specifically, the scientific community still seems conflicted. There is no guarantee of a better outcome. One major competitor (she did not mention the name) offers single and double options. Therefore, ACS decided to repeat the survey. Obviously, it is not an easy decision for any size journal or publisher to switch from one model to the other. Ms. Coghill introduced a very interesting feature, ‘artificial intelligence in publishing and certain stage of peer review process’ called ‘review assistant.’ She further described the arti-

cial intelligence projects at ACS for ‘related content,’ ‘review recommendation,’ and ‘manuscript transfer.’

A few points about recruiting reviewers were described, specifically about being very careful when a person with a non-organization-based e-mail is contacted. Furthermore, when reviewers are recommended (by authors and colleagues), caution is needed. For instance, why the persons are recommended should be explained together with their expertise in the area. It is always a good idea to have a certain level of diversity in a reviewer pool, whether or not the manuscript that has been reviewed is accepted. It is also necessary to know what is different from the reviewers’ decisions (and why), together with an editorial decision letter. It is probably the most important factor for journals and publishers to keep a good team of quality reviewers. Thus, certain type of awards for the reviewers should include publishing their names, invitation to the peer reviewer week, hosting a reception for reviewers at events, sending personalized cards or letters, providing certificates, and sending them calendars, luggage tags, and other types of swag.

Editors from the *New England Journal of Medicine* (NEJM) dissected the journal based on the data from 2017 and found that there have been constant changes (mobile, feedback, etc.) with their features and sharing capabilities (e.g., allowing each article to directly connect to Facebook, Twitter, LinkedIn, email, copy URL). Furthermore, they noticed that visits by device (e.g., smartphone) increased dramatically after changing the layout. The NEJM also provides a weekly eTOC (electronic table of contents). Although this is not a new feature at the NEJM, it is a good idea for publishers and journals that do not provide such an option for their readers. Of course, it is also important to ask about the authors’ satisfaction. Some strategies the NEJM has recently tried out include visual abstract, “Instagram, Facebook, and Twitter” posting, quick references for clinicians, a social network service link in each article, and to make a well-fit presentation on each article, animation and video (one of the editors or editor-in-chief added a voice-over with caption).

The following information was provided by Christine Casey (Editor, MMWR Serials) after the roundtable discussion. Oxford University Press provides the content ‘Measuring research: what everyone needs to know’ by Cassidy R. Sugimoto and Vincent Larivière [2]. Embargo Watch provides various issues on ‘keeping an eye on how scientific information embargoes affect new coverage’ [3]. The strategies to recruit submissions were discussed and the *Journal of Unmanned Vehicle Systems* (contact Dominique Chabot) which was paired with a higher-impact journal for a ‘joint virtual’ issue of related fields was introduced [4].

The 2019 CSE annual meeting on May 6, 2019 started with

a keynote address, entitled 'Project management, chickens, goats, and kids,' by Marjorie M. K. Hlava (President of Access Innovations, Inc.). She discussed taxonomy and information systems and emphasized the importance of being a 'futurist.'

GDPR was introduced and discussed by Pamela Miller (special projects, NEJM), David Riley, and Heather Tierney (Manager, Publication Ethics, ACS). GDPR is a regulation in the European Union (EU) that pertains to data protection and privacy for all individuals within the EU. The talk was interesting as it discussed (with an audience from elsewhere, not necessarily just from the USA and EU) the actual experience on the export of personal data outside the European Union. In particular, they provided actual cases and discussed the matters as follows. In case 1 on legal and ethical issues for retraction, what is the policy at the time of submission, including the GDPR agreement? Since everything is very international, it is very complicated, for example, to correspond with authors from other countries using data from many sources (or countries). In case 2, would the journal (editorial or editor-in-chief) allow a survey of corresponding authors (opt-in vs. opt-out, and no response)? Potential problems and limitations discussed included the fact that lawyers from different region seem to interpret the regulation differently. In case 3, medical records affiliated with EU patients get asked about liability and its proper use. There was an intense discussion about this issue on whether clients in EU would all be okay with this, and, if not, does the server location, the type of data collected, any other liability and legal obligations, and the time of the regulation (May 25, 2018) matter? The panel suggested the publishers and journals that have a lot of reviewer names on the list should opt-out, especially those who do not respond (whether or not their information is correct); specifically, personal information should be deleted immediately, including their e-mail, data, and document.

The session 'Preprint submissions to journals: what's your policy?' was led by Darla Henderson (Assistant Director, Open Access Programs, ACS Publications), Allison Leung (Senior Editor, Social Science Journals, Sage Publishing), and Laura Remis (Assistant Managing Editor, Science Advances, American Association for the Advancement of Science). The speakers focused on similar, but not the same, policies set by publishers and journals for preprint submission for publication, followed by changes and future prospects. Helen Atkins (Senior Manager, ACS), the session moderator, said that ACS has 36 different preprint policies and therefore there is no such thing as a 'gold standard,' thus it is a case-by-case decision for journals and publishers. In fact, all preprint journals do have different policies. Ms. Atkins explained certain advantages of preprint journals, where some cases showed a lot more attention to preprint articles (e.g., ChemRxiv). She also

appealed for the necessity of a direct journal transfer, although there are (potential) policy problems. Allison Leung explained that the SAGE preprint community is composed of approximately 1,000 journals and over 900 books. In addition, 83% of EU and US journals accepted preprints. She described not only submission guidelines and updated submission systems but also the need for continued education and refinement of policies.

At the end of the session, there was a discussion about the preprint system, where once an article is accepted in the preprint system (opt-in) but then none goes out system (opt-out). Ms. Remis made various points about the potential issues with preprints including scooped novel premature data, poor quality, embargo and press release conflict, and potential decline (while it remains in the preprint system). With this in mind, she mentioned that the AAAS (*Science* and its sister journals, *Science Signaling*, *Science Translational Medicine*, *Science Advances*, *Science Immunology*, and *Science Robotics*) allows preprints with its own policy. Indeed, one can find an article in the 'Policy Forum' of *Science* where editor-in-chief of *Science* introduced preprint [5]. At the end of the session, there was a Q&A about the 'retraction policy' in preprint journals, as it does not seem to have any firm policy or regulation, but it does comply with the Committee on Publication Ethics (COPE). The other issue discussed was what level and how much verification of the manuscript should be done for simultaneous submission during the revision. The answer was that it has to be checked during every step of the processing.

One interesting session was the Update on the MECA Initiative by Joel Plotkin (CEO, eJournal Press), Eric Hall (Sr. Product Manager, HighWire Press), and Caroline Webber (business systems analyst, Aries Systems Corporation). The session description said that authors lose time and effort when their manuscript is rejected by a journal, and they have to repeat the submission process in subsequent journals. For reviewers, it is estimated that 15 million hours of researcher time is wasted each year repeating reviews. In addition, with the rise of preprint servers as an acceptable source of new submissions, there is a desire to have a seamless process to push papers from preprint servers to journals, including peer review information related to the preprint being transferred. All of these challenges could be addressed if journals, publishers, and preprint servers could transfer manuscripts between publications that use different submission-tracking systems. In 2017, a group of manuscript-management suppliers (Aries Systems, Clarivate, eJournal Press, and HighWire) took up this challenge and developed a common approach, including a set of guidelines and best practices that publishers, manuscript systems, and other players in the scholarly publishing ecosystem, such as preprint servers, authoring tools, and pro-

duction services, can utilize so that communication between varied and diverse organizations can be more easily achieved.

In 2018, this initiative was accepted by the National Information Standards Organization (NISO), and a NISO working group was formed. This working group includes representatives from the original team of manuscript-management suppliers as well as representatives from the ACS, American Physical Society, Cold Spring Harbor Lab, eLife, IEEE, Green Fifteen, Jisc, Journal of Clinical Investigation, National Library of Medicine, Springer Nature, and Taylor & Francis. The goal of the NISO working group is to make sure that the guidelines and recommended practices will be well thought out and universally accepted. The guidelines will continue to evolve to address new technologies and changes in data types and file formats that will likely emerge in the scholarly publishing infrastructure over the next few years. Tony Alves (Director of product management, Aries Systems Corporation) was the moderator of the session that touched on the historical background, current status, and upcoming issues. Panelists in this session saw the problems and opportunities on the issues with manuscripts going from journal to journal, and from preprint to journal. Caroline Webber described what they have done to set such activity and explained Megadata: JATS.xml; ID: Unique identifier; and TRANSMISSION: Secure FTP. Joel Plotkin showed some practical cases including EMBO, RUP (Rockefeller Univ Publ), CSHL, and Cellbiology network: JCB JCS MBoC for the transfer between sub-systems. Eric Hall explained the 'J2B or B2J (journal-2-bioRxiv bioRxiv-2-journal)' case where the first thing to do is to discuss and set what kind of information and data will be sent. There were questions from the audiences as follows. Q1. How much info could be sent? A1. Society may think, for example, the review and reviewer's name together with the review contents could make authors' lives easier. However, it could be a case-by-case decision. Q2. CC BY conditions its use (or differences). A2. It is only a coding matter at the end user (i.e., a personal matter). Besides, an author can use and modify xml and may not be the problem. Q3. CoI on information and data share. A3. It is possible.

On the second day of the CSE 2019 annual meeting (May 7, 2019), the plenary speaker, Bernadette Melnyk (Vice President for Health Promotion, University Chief Wellness Officer, Dean of the College of Nursing, Ohio State University) addressed the issue of work-life balance by sharing her personal difficulties and challenging life. She appealed strongly to the audience to be a positive person. She threw out a number of key questions and phrases to the audience to make the atmosphere vivid and make the audience feel involved. For instance, she asked: What would the last ten years of your life look like? Self-care is necessary in order to take care of others,

and one should be strong enough to embrace this. Heart attack is the number one killer in the US (1 in 3), so the self-care (one's behavior) is extremely important. Then, she asked everybody to stand up and follow her movements and emphasized the needs for 50 minutes of work combined with 10 minutes of non-sitting behavior. She also stressed that 20 minutes of activity improves brain circulation and functioning, stating that 80% of chronic diseases can be prevented by a healthy lifestyle. She proposed three keys for happiness: purpose, passion, and pride. She also asked everybody to stay aligned with their own dreams and passions.

The session entitled 'creating and implementing a data policy' might be important for publishers who want to have a data policy but have no roadmap to create one. This session was organized by inviting various stages of societies. Currently, publishers' signatories for a data policy number over 100, including Science, PLoS, Elsevier, F1000, Nature, Wiley, and more. Although I was not able to follow the technical terms, there was an explanation about FAIR-Aligned [6] and Repository Finder developed by Datacite [7].

Michael Friedman explained 'data policy procedure' with conflicts or differences between FAIR and revised data policies based on software, model output, big dataset, and enforcement. Kerry Kroffe described the PLoS policy where authors must provide a data availability statement describing their compliance with PLoS policy; currently, about 115,000 papers are published in PLoS with data availability statement. Kerry Kroffe further emphasized the difficulties and expectation for 'data policy' by mentioning challenge created by broadening the scope, highly controversy at the time of inception, and considerable effort to implement. Alyson Weidmann (ACS) discussed 'issues of reproducibility in chemistry and biology' by first saying that a very high percentage of data are not reproducible (60 to 80%). Thus, ACS set a task force for biological data guidelines for ACS (biological data guidelines policy) for enforcing proper statistics and explanation of methods. At the end of the session, there were questions as follows. Q1. Is there a data policy for medical science with clinical (patient) data? A1. Not yet, and one has to be very careful with the process. Q2. Is there a consistent structure, domain, and tagging cross other datasets? A2. Not really, if domain is different then, they may use a different repository.

The session entitled 'a picture's worth 1,000 words: disseminating research through graphical and visual abstracts' was also interesting and fresh. Graphical and visual abstracts have emerged as a powerful tool to disseminate and share research fast and accurately for busy scientists with the constant flow of new or advanced content. It is seemingly the best way to communicate complex research findings within a short time to reporters and to lay audiences in a more digestible format.

Although one of the drawbacks is there is no repository (a database with hashtags has been discussed) for the graphical abstract yet.

Andrew Smith (production operations manager, Cell) presented a talk entitled ‘graphical abstract: From the future to today,’ suggesting that this (i.e., graphical abstract) is created by an author, not peer-reviewed, for its first impression. He also introduced and explained, ‘Cell press graphical abstract guidelines’ in which the pdf version is available [8]. He added that a few benefits of this include that (1) ultimate sophistication becomes simple should be a huge benefit for author(s) and readers, (2) authors can use this in their presentation, and (3) on their SNS.

Mary Dott (MMWR) gave a talk on ‘Using visual abstract at MMWR,’ introducing how the visual abstract and posters have evolved over time at MMWR. She mentioned that the changes during past years include competition with SNS in accordance with more people accessing information via digital devices than desktop computers. However, it was obvious that without some strategic planning, it would be near impossible to do without mentioning the cost. Ms. Dott talked about setting time line satisfaction, setting the target audience, the gradual impact (i.e., not an immediate effect after setting), consideration of visual abstracts in media, know-how (tips, tools, and tricks), engaging your team, embracing innovation, and endless review. She mentioned that the ‘noun project’ [9] would help.

A few poster presentations (there were seemingly not many poster presentations at this meeting) were displayed with the chance to meet with the authors. Rachel Winfield’s poster, ‘getting to know your authors: findings from the impact assessment and project appraisal’s 2018 author survey,’ demonstrated that the composition and geography of editorial board members is varied yet concentrated on advanced economies, and that there is a positive relationship between the number of editors on an editorial board and the number of articles published by that journal. Furthermore, she showed that the larger an editorial board is, the more likely the board includes higher geographic diversity. Another poster, entitled ‘factors on citation impact of publications in engineering, materials science, and medical journals (Hyunju Jang et al.),’ suggested that journal publishers and editors in Korea should attempt to attract more publications by foreign authors to increase their visibility and likelihood of being cited. Another poster, ‘transpose landscape study on journal preprint and peer review policies (Jessica Polka et al.),’ highlighted the need for journals to clearly and explicitly state policies on their websites. While authors and reviewers may possess tacit knowledge about peer review or pre-printing practices within their fields, lack of explicit information may inhibit practices or expose re-

searchers to risk.

Overall, the meeting was informative and well-organized, although I left with a feeling of fatigue from traveling a long distance. I also found it impossible to attend simultaneous and parallel sessions, and it was too dynamic to have time to chat with the speakers. However, needless to say, I was able to strengthen my grasp of new and old issues on scientific publishers and journals.

## Conflict of Interest

Cheol-Heui Yun has served as an editorial board member of the *Science Editing* since 2014 but has no role in the decision to publish this article. Except for that, no potential conflict of interest relevant to this article was reported.

## Acknowledgments

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## Workshop for scholarly journal publishing 2019

Hye In Park

The Korean Urological Association, Seoul, Korea

Time and date: 12:00-17:00, March 7, 2019

Venue: International Conference Room, National Library of Korea, Seoul, Korea

Theme: Workshop for scholarly journal publishing 2019

Organizer: Korean Council of Science Editors

The workshop for scholarly journal publishing 2019, jointly hosted by the Korean Council of Science Editors (KCSE) and the National Library of Korea was held on March 7, 2019, at the International Conference Room, National Library of Korea. Similar to the workshop for scholarly journal publishing in September 2018, this event was highly anticipated to provide a meaningful time in meeting and sharing information with other participants as was its predecessor (Fig. 1).

The event began with a lecture on the role of journal authors and international author identifiers. In scientific articles, authorship is gaining its importance more than ever. Among the various types of authors, there are corresponding authors, first authors, co-authors and more, which heavily depend on each journal's criteria for accepting co-corresponding authors or co-first authors. The ordering and roles of authors should be negotiated among the authors. The order of author names is usually arranged according to their respective contributions, with the first author being the person who has made the greatest contribution. There are often cases where authors request for the addition, deletion, or reordering of authors after submission; such issues must be discussed and agreed upon by all authors and approved by the Editorial Board. Whenever possible, it is recommended that the order of the authors and their English names be clearly confirmed by the corresponding author. Author identifiers include ORCID (Open Researcher and Contributor ID), ISNI (International Standard Name Identifier), Researcher ID, and Scopus Author Identifier. Since there are many authors with the same name and abbreviation, a growing number of journals are adopting authors' unique identifiers.

The second lecture was an introduction to the online repository and electronic journal archives of the National Library of Korea. When submitting a journal to the repository, one can upload online files, send storage media, or indicate the URL of the journal website. A convenient method can be chosen depending on the number and frequency of journal publications. The National Library of Korea is continuously contributing to the permanent preservation of submitted materials through digital archiving (<http://seoji.nl.go.kr/archive>).

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**Correspondence to** Hye In Park  
[uro-edit@urology.or.kr](mailto:uro-edit@urology.or.kr)

**ORCID**  
Hye In Park  
<https://orcid.org/0000-0003-3324-7985>



Fig. 1. Group photo of the workshop for scholarly journal publishing 2019 (March 7, 2019).

The workshop continued with an education session about how to write an e-mail in English. International journals often require communication with authors from foreign countries via e-mail. What I acknowledged from my previous working experience was the importance of formality and conciseness in writing along with the use of proper grammar. This session provided various tips in such areas, which would help writing in the correct manner. Afterwards, we were also provided with a practice session where we could detect and correct errors using actual e-mail examples. I became more aware of the expressions I had frequently used and was able to change them in a more refined way.

Finally, there was an introduction to manuscript editing qualifications and curricula. In Korea, there is a certificate system for manuscript editors operated by KCSE since 2016. A total of 67 certificates have been awarded to date. It offers a good opportunity for editing professionals to verify their competency as manuscript editors and develop the relevant knowledge through preparation for the examination.

After the lecture, there was a group discussion on the required qualifications of the members of a publishing team. The publishing team includes editorial staff of academic societies, layout editors, website and JATS XML file producers, and manuscript editors. Because punctuality is very important in publishing an academic journal and many experts work to reduce errors as much as possible, the most important work guideline in editing is considered to be a fast and accurate publication. Moreover, much time and effort are

spent while a manuscript is submitted, reviewed and published. Therefore, the publishing members need to have an overall thorough knowledge about manuscript editing and the publishing process, along with communication skills with domestic and foreign authors and reviewers. I also think that sincerity and cooperative spirit are necessary virtues for the members, in addition to the sense of responsibility to take charge of the entire work.

In order to enhance such qualities, it is necessary for publishing staffs to accumulate experience in reading many papers and journals. Analyzing the publishing style and website composition of various domestic and international journals will facilitate the better improvement of one's own journal. It is also helpful to gain specialized knowledge on editing and to expand exchanges with relevant professionals through training courses and workshops held at specialized institutions such as KCSE.

Throughout the time at this workshop, I realized that everyone was working with responsibility in their positions. Sharing the difficulties and new ideas for development among the members of different institutions made it a meaningful and rewarding event.

### Conflict of Interest

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

## How publishers can work with Crossref on data citation

Rachael Lammey

Crossref, Oxford, UK

### Abstract

It aims to explain why data citation is important, how publishers and data repositories can do this and what use will be made of the information they provide. There are large benefits to be accrued from sharing research data such as guarantee of reproducibility and transparency. Consistent citation practice around data is essential to helping these benefits to be realized. Data citation metadata is being disseminated and used through its application programming interfaces and the Event Data application programming interface. Event Data extracts this information into a separate service, so data citations are pre-filtered from the Crossref metadata. There are two methods by which publishers can register data citation information with Crossref. The first method is to deposit data citations in the citation section of the metadata, i.e., the part containing the reference list of the article. The second method publishers can use to register data citations with Crossref is to use the relationships section of the metadata. There are a number of services already using Event Data to show information on data citation. To achieve the benefits of data citation, publishers or editors should have a data sharing and citation policy so that they share with their authors and readers.

### Keywords

Crossref; DataCite; Digital object identifier; Data citation; Best practice

### Introduction

To put it simply, data citation is done when a journal article references the data the research was built upon or references, in the same way that a paper would normally provide a reference list to other scholarly resources, such as other papers. Even though an increasing number of researchers are starting to share their data, this data is often not cited in the same way as other publications. Furthermore, it is not cited in a consistent way. This makes it hard to track how the data that underlies the research is actually being used if it's sitting in a separate repository or on another website that is not linked to the paper in any way.

Making it easier to see these links between different types of research outputs will provide many benefits to the community. It aids transparency—showing the underlying data that pro-

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**Correspondence to** Rachael Lammey  
[rlammey@crossref.org](mailto:rlammey@crossref.org)

#### ORCID

Rachael Lammey  
<https://orcid.org/0000-0001-5800-1434>

duced the research results so that you can verify it—and reproducibility—if you can get the data, it can make it easier to reproduce or reuse to replicate or build upon the research.

To incentivise the sharing of research data, researcher need credit for doing this. When they cite the data they use this forms the basis for a data credit system, i.e., a way to reward data sharing by looking at citation and other metrics to measure the impact of the data. Funders are keen to realise these benefits for the research they fund, and many are starting to bring in mandates around how data is published and shared.

## How Publishers Can Get Started

There are a few steps that publishers can work through to get to the point where they can register data citations with Crossref. DataCite, Crossref and others have collaborated on a paper that sets out what publishers need to do in a number of steps [1]. These are as follows: 1) develop a data policy that includes data citation; 2) explain to authors how they should be citing data in the submissions they make to their publications; 3) update internal workflows, DTD (Document Type Definition) check and instructions to suppliers (for example proofreaders, typesetters) about how to handle these citations; and 4) include the citations in the metadata that you register with Crossref so that these can be disseminated and used.

Many publishers are already taking steps to implement data citation policies, so others can learn from them, and recent case studies by Springer Nature and Taylor & Francis may also be of assistance [2]. They also provide information on how this information can be communicated to authors via the journal Instructions for Authors and their online submission systems.

Copyeditors, typesetters and other parties who prepare

content for publication can be briefed on how to format data citations and data availability statements, and finally, there are a number of methods to register this information with Crossref when publishers deposit identifiers and metadata upon or just before publication.

## Registering Data Citation Information with Crossref

There are two methods by which publishers can register data citation information with Crossref. Both are supported and publishers are using a mixture of these based on what fits best with their publication workflows.

The first method is to deposit data citations in the citation section of the metadata, i.e., the part containing the reference list of the article. Publishers can deposit the full data or software citation as a unstructured reference, an example is shown in Fig. 1. It is recommended that publishers ask authors to cite the dataset or software based on community best practice, outlined in the Joint declaration of data citation principles [3], FORCE11 citation placement [4], and FORCE11 software citation principles [5].

Otherwise, they can employ any reference tags [6] currently accepted by Crossref, shown in Fig. 2. At the very least, even just a reference containing a DataCite DOI is enough for Crossref to recognize that the author is citing data in the reference.

Adding data citations using this method is a good option for publishers who already deposit reference metadata with Crossref (this is optional but recommended) and make this metadata openly available via Crossref (also optional as explained in Crossref's reference distribution policy [7]). If publishers who make their references openly available via Cross-

```
<citation key="ref=3">
<unstructured_citation>Morinha F, Dávila JA, Estela B, Cabral JA, Frías Ó, González JL, Travassos P, Carvalho D, Milá B, Blanco G (2017) Data from: Extreme genetic structure in a social bird species despite high dispersal capacity. Dryad Digital Repository. http://dx.doi.org/10.5061/dryad.684v0</unstructured_citation>
</citation>
</citation_list>
```

**Fig. 1.** Unstructured citation example of data citation in Crossref metadata.

```
<citation key="ref2">
<doi>10.5061/dryad.684v0</doi>
<cYear>2017</cYear>
<author>Morinha F, Dávila JA, Estela B, Cabral JA, Frías Ó, González JL, Travassos P, Carvalho D, Milá B, Blanco G</author>
</citation>
```

**Fig. 2.** Citation example of data citation in Crossref metadata using Crossref reference tags.

ref deposit data citations in this way, they are automatically made available via Crossref's different metadata delivery methods [8]. If the citations contain DataCite DOIs, they will also be made available by a new service called Event Data [9], which is being co-developed by Crossref and DataCite.

The second method publishers can use to register data citations with Crossref is to use the relationships section [10] of the metadata shown in Fig. 3. As shown in Fig. 3, the relationships method lets publishers provide more specific information as to how the data being cited and the article relate to each other. If the article simply references a dataset, the relationship type 'references' can be used, or if the author wants to specify that the data was generated as part of the research, 'isSupplementedBy' can be used. A description of the data, an identifier for the data and the identifier type should all be provided, and this identifier type is not limited to the DOI, many other types of identifiers are accepted: PMID, PMCID, PURL, ARK, Handle, UUID, ECLI, and URI.

Publishers may want to use this method for depositing data citations if they prefer to provide this level of specificity as to how the data is related to the paper. This information can be used to support scientific validation and funding management, i.e., funders may use it to check that authors they fund are following their mandates regarding data availability. Publishers who do not make their references openly available via Crossref should also use this method.

For publishers interested in using the reference method of depositing this information, Crossref is working to implement the JATS4R recommendations [11] which will let publishers add more descriptive information like relationships between data and publications to their reference list metadata. These changes to the Crossref schema will be implemented in 2019.

Data citation metadata can be registered with Crossref using the existing methods that members use to register content, e.g., it can be added to complete metadata deposits, or registered in reference-only deposits [12], which many publishers use to add reference data to their records. Additionally, relationships information can also be added to existing Crossref deposits using a resource deposit [13]—so that a publisher

can patch this into their metadata if they want to add it retrospectively. Crossref's new Metadata Manager tool (beta) [14] supports the deposit of both types of article/data links.

## How Data Citation Metadata is Being Disseminated and Used

Asking authors for this information, collecting it and then registering it with Crossref in a standard way is a valuable thing for publishers to do. However, this information then needs to be disseminated effectively so that the research community can get maximum value from it. Crossref shares information on data/article links via a number of output methods: its application programming interfaces (APIs) and the Event Data API. Relationships metadata is not currently available via Event Data, but this will be added in 2019.

The Event Data service was jointly developed by Crossref and DataCite to capture references, mentions and other events around DOIs that are not provided via DOI metadata. It includes references of different DOI registration agencies, like data citations. Before Event Data, if anyone wanted to find links from articles to data, they would have to access the full set of Crossref metadata and extract this piece of information across all Crossref DOIs and metadata. The same goes for data to article links—the DataCite metadata would all need to be mined and this information extracted. This approach is quite manual and therefore does not scale well, so publishers and repositories were disincentivised to provide this information as they could not see it getting used.

Event Data extracts this information into a separate service, so data citations are pre-filtered from the Crossref metadata (and the same at DataCite for data to article links). That way they can be easily found, filtered upon and integrated into tools and services. For example, a publisher interested in seeing the links to their publications from dataset metadata held by DataCite can query the Crossref Event Data API by their DOI prefix to ask for that information (Fig. 4). Both Crossref and DataCite's Event Data APIs are open and free to use, so anyone can access this information.

```
<program xmlns="http://www.crossref.org/relations.xsd">
  <related_item>
    <description>Data from: Extreme genetic structure in a social bird species despite high dispersal capacity</description>
    <inter_work_relation relationship-type="references" identifier-type="doi">10.5061/dryad.684v0</inter_work_relation>
  </related_item>
</program>
</doi_relations>
```

Fig. 3. Example of data citation in Crossref metadata using the relationships schema.

There are a number of services already using Event Data to show information on how data is being cited, so that researchers can easily see who is interested in the data that they have produced. Fig. 5 shows the University of California's Dash tool.

Dash is a self-service tool for researchers to describe, upload, and share their research data. To the right of the bibliographic information on the dataset they are displaying the citations to the data that they have uncovered using Event Data. Clicking

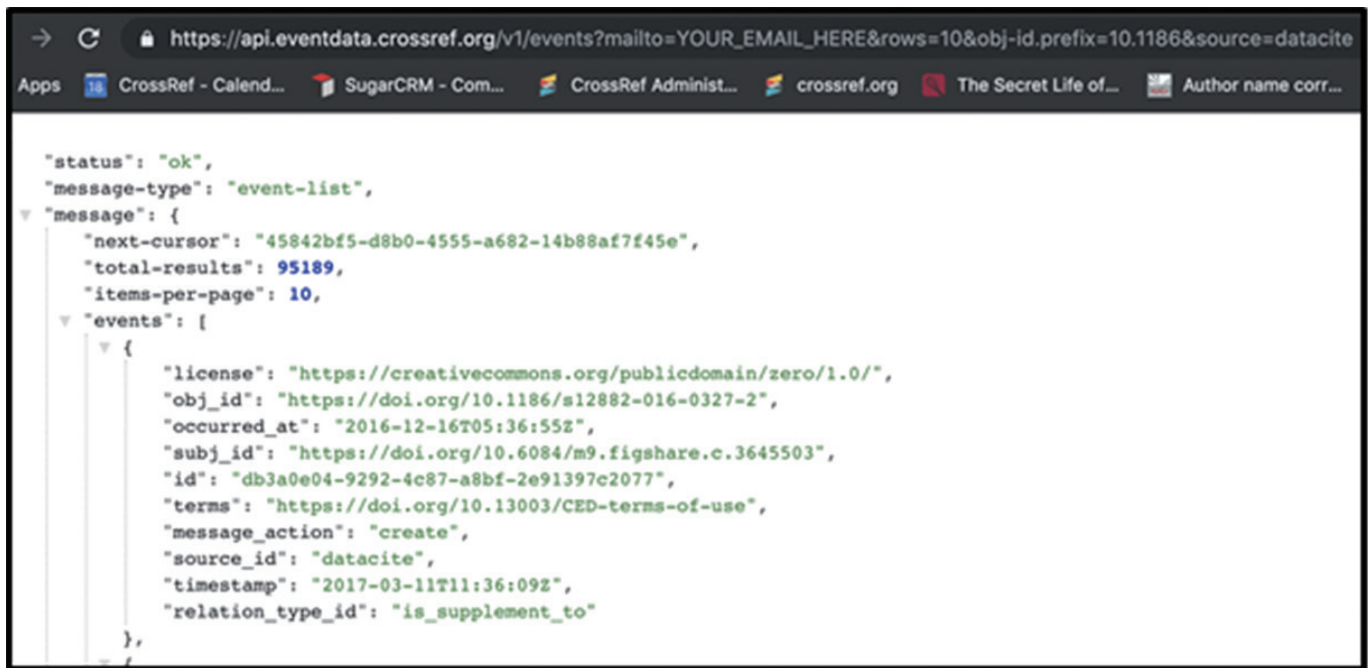


Fig. 4. Event Data application programming interface results (this sample query asks Event Data to show 10 events related to DataCite DOIs (links to datasets) for the PLOS (Public Library of Science) DOI prefix.



Fig. 5. Data citation display in the University of California Dash repository (<https://dash.ucmerced.edu/stash/dataset/doi:10.6071/M3RP49>).

on the hyperlink then brings up the specific citations to the dataset which is useful information for anyone looking at this.

Regarding these citation counts, the Make Data Count project is working (among other things) to address the significant social as well as technical barriers to widespread incorporation of data-level metrics in the research data management ecosystem through consultation, recommendation, new technical capability, and community outreach [15]. They are strong advocates around data citation practices. Information on data/article links can also be aggregated by search services and databases. DataCite is integrating information on data citation and usage into its own DataCite search so that anyone using it can see how often a dataset has been viewed, cited or downloaded. Another example is Schoexplorer, service that populates and provides access to a graph of links between dataset and literature objects and dataset and dataset objects [16]. Schoexplorer uses Event Data, along with other sources to populate the information it contains on published articles and datasets. The expectation is that use of this information will grow over time as more publishers and data repositories collect and register this information as part of their standard workflows.

## Conclusion

Linking to the data related to a published article provides a wide range of benefits for the research community. To achieve these, publishers should have a policy around data citation that they share with their authors, they should aim to collect this information and register it with Crossref in the metadata they provide, either in the references or relationship section of the Crossref schema. Data repositories can do the same (via DataCite) to assert connections between data and published articles. This information can then be made available by Crossref and DataCite via their metadata and Event Data APIs. This lets them be integrated into a growing amount of tools and services and easily accessed and used by anyone engaged in research.

## Conflict of Interest

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

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# How to archive scholarly journals from the Republic of Korea in the National Library of Korea

Sun Huh

Department of Parasitology and Institute of Medical Education, College of Medicine, Hallym University, Chuncheon, Korea

### Abstract

According to the policies of a number of indexing database agencies and the *Principles of transparency and best practice in scholarly publishing* 3rd version, archiving of scholarly journal articles is mandatory for editors and publishers. Furthermore, publishers in Korea have been required to deposit journal article files in the National Library of Korea since February 2016 by law. This study presents background information on archiving sites and how to deposit digital files in the Library's archive. Although some archiving sites for scholarly journals have been developed internationally, it may be burdensome for publishers in Korea (almost all of which are academic societies) to use those sites to deposit digital files because a deposit fee is required by some agencies. Furthermore, PubMed Central, maintained by the United States National Library of Medicine, accepts only English-language biomedical journals. In contrast, it is possible for publishers to deposit articles in the National Library of Korea by uploading files without any fees, regardless of the journal language. Furthermore, publishers can select the access policy of their journals. All journal publishers and editors in Korea are recommended to utilize the archiving site of the National Library of Korea to preserve their journal articles.

### Keywords

Archives; National Library of Korea; Republic of Korea; Scholarly communication; Scholarly journals

### Introduction

The *Encyclopedia Britannica* defines the term “archives” as follows: “Archives, also called records or record office, repository for an organized body of records produced or received by a public, semipublic, institutional, or business entity in the transaction of its affairs and preserved by it or its successors. The term archives, which also designates the body of records themselves ...” [1]. In journal publishing, “archiving” implies preserving the print version of

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**Correspondence to** Sun Huh  
[shuh@hallym.ac.kr](mailto:shuh@hallym.ac.kr)

**ORCID**  
Sun Huh  
<https://orcid.org/0000-0002-8559-8640>

journal documents, which can be found in libraries. After scholarly journals started to be published in a digital format in the 1990s and internet access became widespread, the concept of “archive” has come to refer to digital archives. Both international journals and domestic journals from Korea began to publish online versions with unique International Standard Serial Number (ISSN, Online). Furthermore, online-only journals (without a print version) emerged and were established as a good business model, as exemplified by the BMC and PLoS series of journals. Several online-only journals are also published in Korea, with a noteworthy example being the *Journal of Educational Evaluation for Health Professions*, which was converted from a print journal to an online-only journal in 2006 [2]. However, the main problem with online-only journals, or journals with online versions, is the accessibility of the content if the journal stops being published for any reason. If the journal homepage disappears, it becomes impossible to access its contents. Therefore, digital archiving of scholarly journals became an important matter.

Furthermore, archiving became an essential requirement for being listed in several abstracting and indexing databases. First, the Directory of Open Access Journals (DOAJ) listed the presence of an archiving site as an evaluation item for open access journals. DOAJ strongly recommends that journal content be preserved through a dedicated digital archiving and preservation service, sometimes referred to as long-term preservation and archiving [3]. Second, the pre-evaluation list for Scopus submission also includes archiving, as follows: “7.7 A journal’s plan for electronic backup and preservation of access to the journal content in the event a journal is no longer published (access to archive) is clearly indicated at journal’s website” [4]. Third, as a prerequisite for application to PubMed Central, the United States National Library of Medicine looks for ongoing publisher conformance with the *Principles of transparency and best practice in scholarly publishing* [5]. Of the 16 items included the *Principles of transparency and best practice in scholarly publishing* 3rd version, archiving is the 13th item, as follows: “A journal’s plan for electronic backup and preservation of access to the journal content (for example, access to main articles via CLOCKSS or PubMed

Central) in the event a journal is no longer published shall be clearly indicated” [6]. Therefore, verification of the archiving site is mandatory to be a PubMed Central journal.

### What Repository Sites Exist for Digital Archiving of Scholarly Publishing?

In the Keepers Registry, the following repositories are listed for electronic journals [7]: Archaeology Data Service, British Library, CLOCKSS Archive, Cariniana Network in Brazil, e-Depot in Netherlands, Global LOCKSS Network, HathiTrust, United States Library of Congress, National Digital Preservation Program in China, PKP Preservation Network, Portico, Scholars Portal of Ontario Council of University Libraries, and the Swiss National Library. According to the information provided by the above agencies, the United Kingdom, Netherlands, and Switzerland are countries with mandatory deposit of e-journals in the national libraries’ archives. The United States requires electronic-only journals to be deposited in the Library of Congress. Of the above 14 agencies, the following repositories in Table 1 are generally open to scholarly journals from around the world.

Besides the above agencies, PubMed Central is a well-known archiving site; however, it only accepts English-language biomedical journals. Although there were 133 journals from Korea listed in PubMed Central through June 2019, issues in Korean before journals changed their language to English-only cannot be listed in PubMed Central. Those issues should be deposited in another archiving site.

### Why Was a Law Mandating Digital Archiving Established in Korea?

In February 2016, Korean Government revised the Library Act as follows to mandate that online publications of books and periodicals be deposited in the archive of the National Library of Korea [8]:

#### Article 20 (Legal Deposit of Library Materials)

(1) When anyone has published or produced a library materi-

**Table 1.** Archiving agencies that generally accept e-journals from all over the world

Archiving agencies	Contents	Access	Payment for deposit	URL
CLOCKSS Archive	Digital scholarly materials	Freely available, when content is not available from a publisher	Required	<a href="http://www.clockss.org/">http://www.clockss.org/</a>
Global LOCKSS Network	E-journals, e-books	Accessible whenever the content is unavailable	Required	<a href="http://www.lockss.org/">http://www.lockss.org/</a>
Portico	E-journals, e-books, and other electronic scholarly content	Access at participating institutions	Required	<a href="http://www.portico.org/">http://www.portico.org/</a>

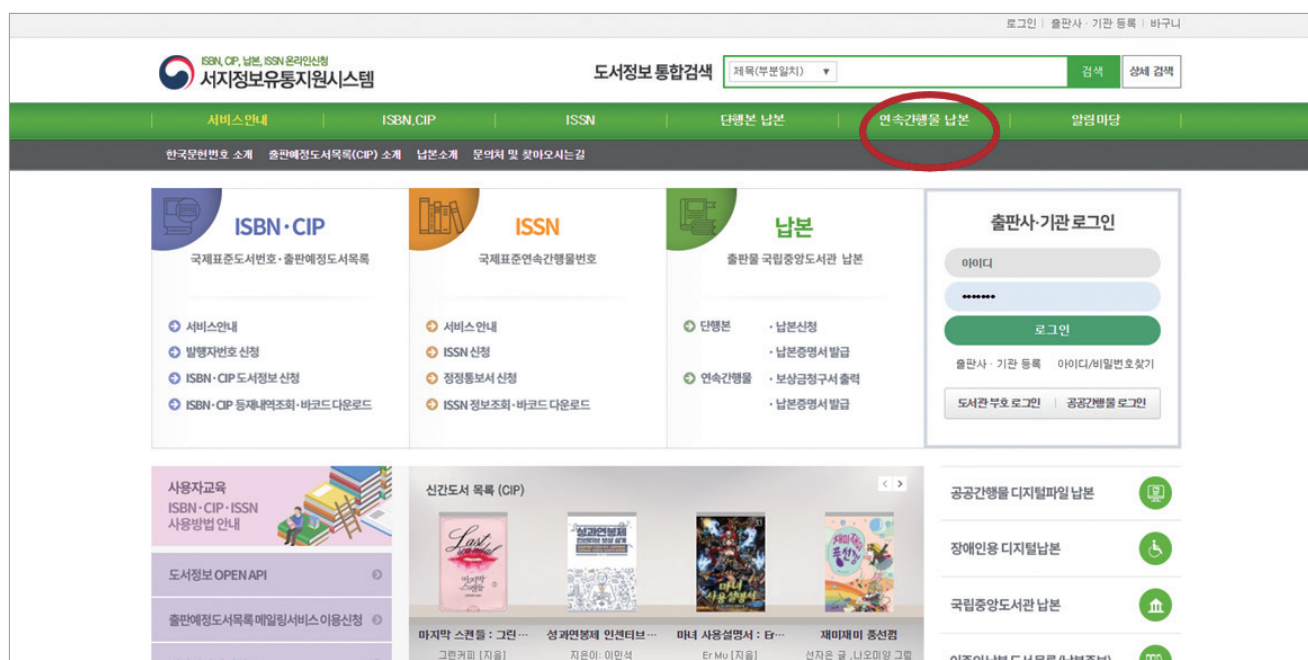
al (excluding online but as prescribed in Article 21, including those to which international standard book or serial numbers are assigned under Article 21 shall be included; hereafter the same shall apply in this Article), he/she shall make a legal deposit of such library materials to the National Library of Korea within 30 days from the date such library material is published or produced. The same shall apply when he/she publishes or produces a revised and enlarged edition. < Amended by Act No. 9528, Mar, 25, 2009; Act No. 13960, February 3, 2016 > (2) Where the State, a local government, or any other public institution prescribed by Presidential Decree makes a legal deposit of library materials to the National Library of Korea pursuant to paragraph (1), it shall ensure such legal deposit in digital file format as prescribed by Presidential Decree. < Newly Inserted by Act No. 13960, February 3, 2016 >

This law was revised to ensure the long-term preservation of digitally published files whenever a publisher goes out of business or journals or magazines stop being published for any other reason. An announcement was made stating that the National Library of Korea will play the role of an archiving site for digital publications, including scholarly journals from both private and public publishers. Therefore, all scholarly journal publishers in Korea, most of which are academic societies, should deposit their electronic journals to the National Library of Korea within 30 days after publication. Journal

publishers can also deposit their digital files to the CLOCKSS Archive, Global LOCKSS Network, and Portico. However, payment is required to preserve digital files with those archiving agencies, whereas no fee is required to deposit journal files in the National Library of Korea because it is a governmental organization.

## How to Deposit Journals' Digital Files in the National Library of Korea Archive

The publisher should visit the bibliographic information system (Fig. 1) [9]. To upload a file, click “periodical submission” and then click “online data submission.” After that, login is required to upload digital files. There is no clear indication of which digital file format is most suitable (e.g., PDF, ebook 3.0, JATS XML, LaTeX, or other file formats); however, uploading PDF files is generally accepted. If uploading the digital files is difficult or there are too many files to upload using this interface, they can be submitted via email, as indicated in the agreement form. Before submitting digital files, publishers should sign an agreement form with the National Library of Korea (Suppl. 1), describing the journal title, author (= publisher), publisher, date of publication, and eISSN. Furthermore, accessibility from outside of the National Library of Korea should be indicated. If publisher does not want to allow access to the digital files outside of the Library, “access only in



**Fig. 1.** Screenshot of the bibliographic information system of the National Library of Korea (<http://seoji.nl.go.kr/index.do>). To upload a file, click “periodical submission” (red circle), and then click “online data submission.” After that, login is required to upload digital files.

the National Library of Korea” should be chosen. If a journal ceases to be published, its digital content will be available according to the access policy of the journal. If it is not an open access journal, it will only be available at the National Library of Korea. Although some society-owned journals are published by international commercial publishing companies not located in Korea, digital archiving in the National Library of Korea is mandatory. If digital files are submitted successfully, that information is presented in a list contained on the site [10], where it will be possible to check which journals have been archived.

### Policies of the National Library of Korea as an Archiving Agency According to Common Explanatory Items of the Keepers Registry

The following suggestions can be made.

**Overview and background:** The National Library of Korea is the archiving site for scholarly electronic journals published in Korea. It is supported by the Library Act of the Korean Government revised in February 2016 that mandates digital file deposit of publications in the National Library of Korea.

**Ingest and preservation workflow:** Content that has been preserved in an archiving site of the National Library of Korea shall be maintained.

**Library access to content:** If the publisher selects open access, the content can be accessed from outside the Library. If not, it is only available inside the Library. Whenever publishing ceases, the accessibility is same as the publisher’s previously chosen option.

**Auditing of content, policies, and procedures (both internal and external activities):** All ingested files are recorded in the catalog upon ingestion.

The policies suggested above should be implemented by the National Library of Korea. Furthermore, it is necessary for the Library to be listed in the Keepers Registry, like other national libraries in the United States, United Kingdom, Netherlands, and Switzerland [7].

### Conclusion

In scholarly journal publishing, archiving of digital files is mandatory. According to the Library Act, all scholarly journal publishers in Korea must deposit journal article files in the National Library of Korea starting in 2016. It is easy and simple to participate in digital archiving after signing the agreement form. I hope that all publishers and editors in Korea take advantage of this opportunity to deposit journal article files in the Library, which will enable them to announce the archiving site used by their journals.

### Conflict of Interest

No potential conflict of interest relevant to this article was reported. It is not an official opinion of the National Library of Korea.

### Supplementary Material

Supplementary file is available from <https://doi.org/10.6087/kcse.180>

**Suppl. 1.** Agreement form for archiving between a publisher and the National Library of Korea.

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9. Bibliographic information supporting system [Internet]. Seoul: National Library of Korea [cited 2019 Jul 5]. Available from: <http://seoji.nl.go.kr>
10. National Library of Korea E-journals Archive [Internet]. Seoul: National Library of Korea [cited 2019 Jul 5]. Available from: <http://seoji.nl.go.kr/archive>

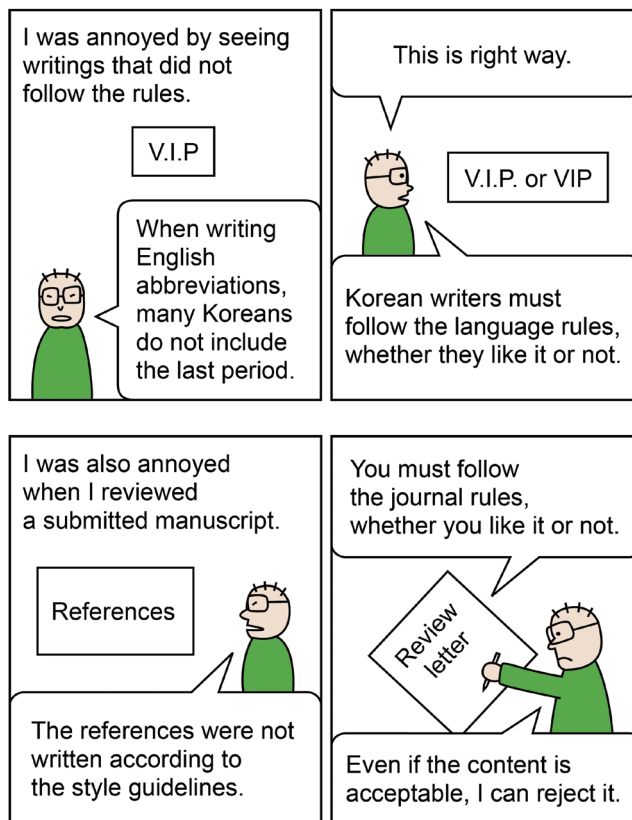
### Follow the rule

Beom Sun Chung, Min Suk Chung

Department of Anatomy, Ajou University School of Medicine, Suwon, Korea

**Dr. Scifun** MS Chung ([anatomy.co.kr](mailto:anatomy.co.kr))

Follow the rules.



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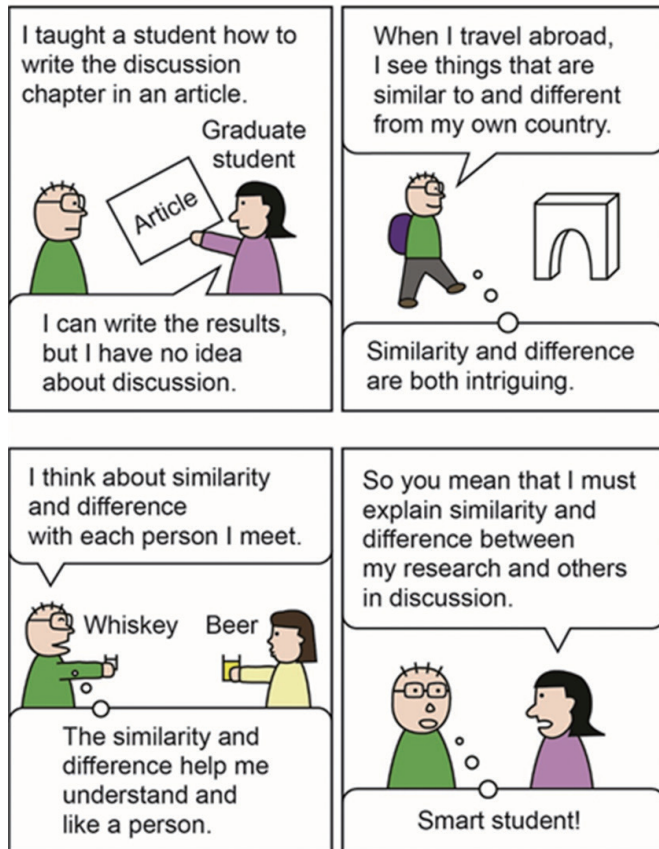
**Correspondence to** Min Suk Chung  
[dissect@ajou.ac.kr](mailto:dissect@ajou.ac.kr)

**ORCID**  
Beom Sun Chung  
<https://orcid.org/0000-0002-3644-9120>  
Min Suk Chung  
<https://orcid.org/0000-0002-0527-9763>

My emotions are sometimes reflected in my evaluations of manuscripts that were submitted to academic journals. This is particularly notable when the manuscripts do not follow the submission guidelines. In my annoyance, my evaluation is often written in a very harsh tone that can make the authors angry as well. I am not the only one who does this—renowned scientists do this as well. Rules are rules.

**Dr. Scifun** MS Chung (anatomy.co.kr)

Similarity and difference



When writing the discussion section of an article, we should distinguish the ally from the enemy. The ally is other studies that support ours, and the enemy is other studies that are against ours. In discussion, it is important to skillfully approach both the ally and the enemy. In most cases, we compliment the ally to an adequate level and criticize the enemy to an equivalent level.

**Dr. Scifun** MS Chung (anatomy.co.kr)

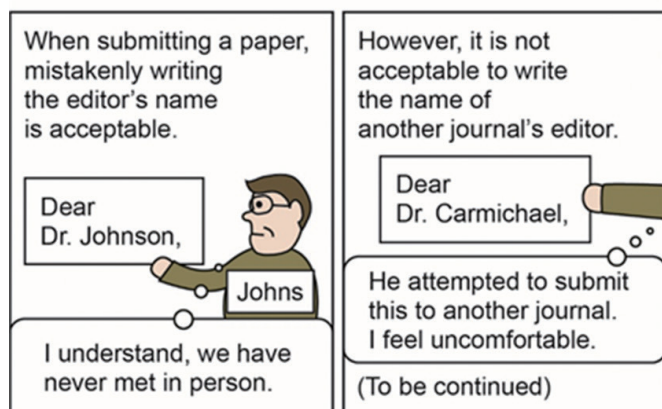
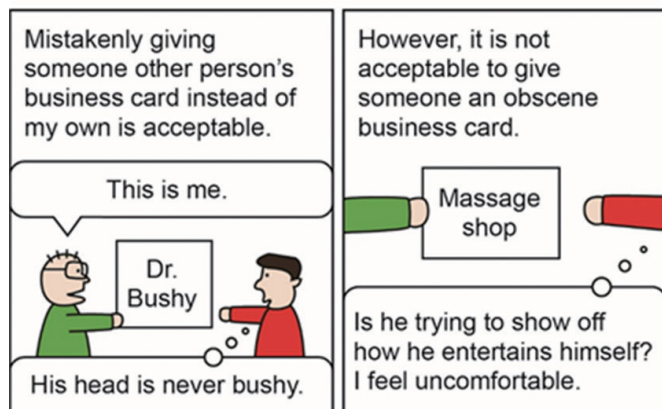
Army, air force, navy



Scientists and soldiers have another thing in common. Scientists and soldiers do not participate well in democracy. Officer orders soldiers like professor orders graduate students. Of course, professor and students can debate with each other. However, the final decision is made by the professor. Democracy is good, but it is not always useful.

## Dr. Scifun MS Chung (anatomy.co.kr)

### Mistakes to avoid 1/2



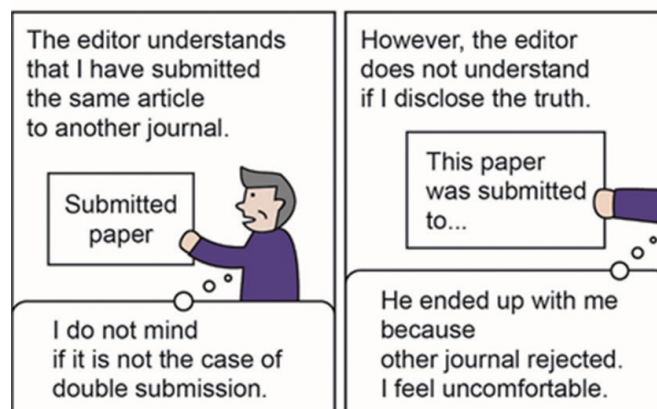
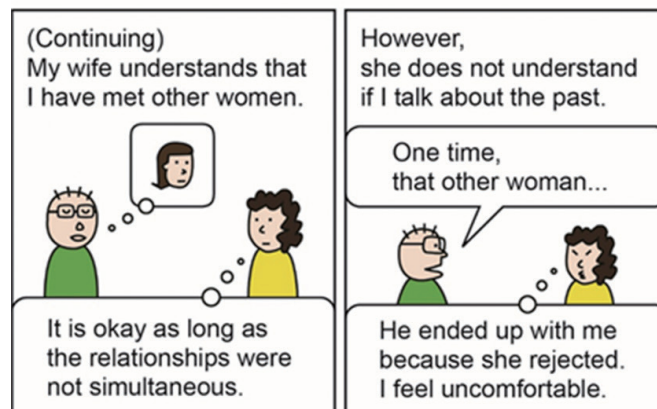
When you meet many people and exchange business cards, a situation like the one in the second panel may happen. This type of mistake should be avoided. Therefore, you had better sort out irrelevant business cards and put them in a place that is hard to accidentally grab, like placing dangerous reagents out of reach.

### Conflict of Interest

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

## Dr. Scifun MS Chung (anatomy.co.kr)

### Mistakes to avoid 2/2



In the second panel, the wife will be under the impression that she is inferior to the other woman. What good comes from hurting the wife's pride? In the fourth panel, the editor-in-chief will believe that his/her journal is not as good as other journal. What good comes from hurting the editor-in-chief's pride? Pride is important for everyone.

### Acknowledgments

This research was financially supported by the Ministry of Trade, Industry and Energy (MOTIE) and Korea Institute for Advancement of Technology (KIAT) through the International Cooperative R&D program (grant no. N0002249).





# Instructions to Authors

Enacted January 1, 2014

1st revised August 20, 2018

Recently revised February 20, 2019

## 1. General information

*Science Editing* (Sci Ed) is the official journal of the Korean Council of Science Editors (KCSE) and Council of Asian Science Editors (CASE). 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>). It also adheres completely to the Principles of Transparency and Best Practice in Scholarly Publishing (joint statement by COPE, DOAJ, WAME, and OASPA; <http://doaj.org/bestpractice>) if otherwise not described below.

## 2. Copyright and Creative Commons Attribution license

A submitted manuscript, when published, will become the property of the journal. Copyrights of all published materials are owned by KCSE. The Creative Commons Attribution License available from: <http://creativecommons.org/licenses/by/4.0/> is also in effect.

## 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 authorship (adding author(s), deleting author(s), or re-arranging the order of authors) must be explained by a letter to the editor from the authors concerned. This letter must be signed by all authors of the paper. Copyright assignment must also be completed by every author.

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- Correction of authorship after publication: *Science Editing* does not correct authorship after publication unless a mistake has been made by the editorial staff. Authorship may be changed before publication but after submission when an authorship correction is requested by all of the authors involved with the manuscript.

## 2. Originality, plagiarism and duplicate publication

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. Submitted manuscripts are screened for possible plagiarism or duplicate publication by Similarity Check upon arrival. If plagiarism or duplicate publication 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.

### 3. Secondary publication

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](http://www.icmje.org/urm_main.html)).

### 4. Conflict of interest statement

The corresponding author must inform the editor of any potential 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 human and animal right

Clinical research should be done in accordance of the Ethical Principles for Medical Research Involving Human Subjects, outlined in the Helsinki Declaration of 1975 (revised 2013), available from: <https://www.wma.net/policies-post/wma-declaration-of-helsinki-ethical-principles-for-medical-research-involving-human-subjects/>. Clinical studies that do not meet the Helsinki Declaration will not be considered for publication. Human subjects should not be identifiable, such that patients' names, initials, hospital numbers, dates of birth, or other protected health-care information should not be disclosed. For animal subjects, research should be performed based on the National or Institutional Guide for the Care and Use of Laboratory Animals, and the ethical treatment of all experimental animals should be maintained.

### 6. Statement of informed consent and institutional review board approval

Copies of written informed consent documents should be kept for studies on human subjects, which includes identifiable information or sensitive information. 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.

### 7. 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 ([\[ethics.org/resources/flowcharts\]\(http://publication-ethics.org/resources/flowcharts\)\). The discussion and decision on the suspected cases are carried out by the Editorial Board.](http://publication-</a></p></div><div data-bbox=)

### 8. Process for handling cases requiring corrections, retractions, and editorial expressions of concern

Cases that require editorial expressions of concern or retraction shall follow the COPE flowcharts available from:<http://publicationethics.org/resources/flowcharts>. If correction needs, it will follow the ICMJE Recommendation for Corrections, Retractions, Republications and Version Control available from:<http://www.icmje.org/recommendations/browse/publishing-and-editorial-issues/corrections-and-version-control.html> as follows:

Honest errors are a part of science and publishing and require publication of a correction when they are detected. Corrections are needed for errors of fact. Minimum standards are as follows: First, it shall publish a correction notice as soon as possible detailing changes from and citing the original publication on both an electronic and numbered print page that is included in an electronic or a print Table of Contents to ensure proper indexing; Second, it shall post a new article version with details of the changes from the original version and the date(s) on which the changes were made through Crossmark; Third, it shall archive all prior versions of the article. This archive can be either directly accessible to readers; and Fourth, previous electronic versions shall prominently note that there are more recent versions of the article via Crossmark.

### 9. 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.

## 4. Author qualifications, language requirement, and reporting guideline

### 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.

## 3. Reporting guidelines for specific study designs

Research reports frequently omit important information. As such, reporting guidelines have been developed for a number of study designs that some journals may ask authors to follow. Authors are encouraged to also consult the reporting guidelines relevant to their specific research design. A good source of reporting guidelines is the EQUATOR Network (<http://www.equator-network.org/home/>) and the United States National Institutes of Health/National Library of Medicine ([http://www.nlm.nih.gov/services/research\\_report\\_guide.html](http://www.nlm.nih.gov/services/research_report_guide.html)).

## 5. Submission and peer review process

### 1. Submission

All manuscripts should be submitted via e-submission system available from: <https://submit.escienceediting.org/>. If any authors have difficulty in submitting via e-submission system, please send a manuscript to [kcse@kcse.org](mailto: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 checked for plagiarism or duplicate publication with Similarity Check. After confirming its result, 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 (double-blind 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. If further revision period is required, author should contact editorial office through form mail available from: <https://www.escienceediting.org/about/contact.php>. A final decision on acceptance/rejection for publication is forwarded to the corresponding author from the editor.

## 3. Peer review process for handling submissions from editors, employees, or members of the editorial board

All manuscripts from editors, employees, or members of the editorial board are processed same to other unsolicited manuscripts. During the review process, submitters will not engage in the selection of reviewers and decision process. Editors will not handle their own manuscripts although they are commissioned ones.

## 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. Abbreviations 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, training materials, editorials, book reviews, correspondence, and video clips. Other types are also negotiable with the Editorial Board.

### 2. Original articles

Original articles are reports of basic investigations. 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), conflict of interest, 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 ab-

stract, 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 concise content of equal to or less than 250 words in an structured format including purpose, methods, results, and conclusion. 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. Conclusion 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 sequence 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.
- **ORCID (Open Researcher and Contributor ID):** ORCID of all authors should be described.
- **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.

- **Appendix:** If any materials are not enough to be included in the main text such as questionnaires, they can be listed in the Appendix.
- **Supplementary materials:** If there are any supplementary materials to help the understanding of readers or too great amount data to be included in the main text, it may be placed as supplementary data. Not only text, audio or video files, but also data files should be added here.
- **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>).

#### Journal articles:

1. Jeong GH, Huh S. Update: Bibliometric analysis of publications from North Korea indexed in the Web of Science Core Collection from 1978 to July 2018. *Sci Ed* 2018;5:119-123. <https://doi.org/10.6087/kcse.135>  
(In case number of authors is over 6)
2. Seo JW, Chung H, Seo TS et al. Equality, equity, and reality of open access on scholarly information. *Sci Ed* 2017;4:58-69. <https://doi.org/10.6087/kcse.97>

#### Books and book chapters:

3. Morris S, Barnas E, LaFrenier D, Reich M. *The handbook of journal publishing*. New York, NY: Cambridge University Press; 2013.
4. Cho HM, editor. *KOFST journals 2011*. Seoul: The Korean Federation of Science and Technology Societies; 2012. [http://dx.doi.org/10.5082/Kofst\\_J\\_2011](http://dx.doi.org/10.5082/Kofst_J_2011)
5. Booth BA. Peer review. In: Coghill AM, Garson LR, editors. *The ACS style guide*. 3rd ed. New York, NY: Oxford University Press; 2006. p. 71-6.

#### Online sources:

6. Committee on Publication Ethics. Guidelines for retracting articles [Internet]. Committee on Publication Ethics; 2009 [cited 2013 Sep 20]. Available from: <http://publicationethics.org/files/retraction%20guidelines.pdf>
7. Testa J. *The Thomson Reuters journal selection process* [Internet]. Philadelphia, PA: Thomson Reuters; 2012 [cit-

ed 2013 Sep 30]. Available from: <http://wokinfo.com/esays/journal-selection-process/>

#### Conference papers:

8. Shell ER. Sex and the scientific publisher: how journals and journalists collude (despite their best intentions) to mislead the public. Paper presented at: 2011 CrossRef Annual Member Meeting; 2011 Nov 14-15; Cambridge, MA, USA.
9. Kim HW. Challenges and future directions on journal “perspectives in nursing science” in Korea. Poster session presented at: Asia Pacific Association of Medical Journal Editors Convention 2013; 2013 Aug 2-4; Tokyo, Japan.

#### Scientific and technical reports:

10. Kim SN, Park JR, Bae HS, et al. A study on the meta evaluation of Korean university evaluation. Seoul: Korean Educational Development Institute; 2004. Report No.: CR 2004-45.

#### News articles:

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](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 footnotes below the tabular matter and not included in the heading. All non-standard abbreviations are explained in the footnotes. Footnotes should be indicated by <sup>a)</sup>, <sup>b)</sup>, <sup>c)</sup>, .... Statistical measures such as standard deviation (SD) or standard error (SE) should be identified. Vertical rules and horizontal rules between entries should be omitted.
- **Figures and legends for illustrations:** Figures should be numbered, using Arabic numerals, in the order in which they are cited. Each figure should be uploaded as a single image file in either uncompressed EPS, TIFF, PSD, JPEG, and PPT format over 600 dots per inch (dpi) or 3 million pixels (less than 6 megabytes). Written permission should be obtained for the use of all previously published illustrations (and copies of permission letters should be includ-

ed). In the case of multiple prints bearing the same number, English letters should be used after the numerals to indicate the correct order (e.g., Fig. 1A; Fig. 2B, C).

#### 3. Reviews

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), conflict interest, 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), conflict interest, 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, main text (introduction, text, and conclusion), conflict interest, acknowledgments, references, tables, figure legends, and figures. The length of the text excluding references, tables, and figures should not exceed 2,500 words. The number of references is limited to 20.

#### 6. Training materials

Training materials are for training editors or publishers. If there are new standards, policies, technologies, guidelines or trends, they can be submitted for training editors or publishers. It may be unsolicited or commissioned. This publication type will be able to provide the practical information for the journal advancement. They are to be organized as follows: title page, abstract and keywords, main text (introduction, text, and conclusion), conflict interest, 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.

### 7. Editorials

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.

### 8. Book reviews

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.

### 9. 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.

In reply: If the Correspondence is in response to a published article, the Editor-in-Chief may choose to invite the article's authors to write a Correspondence Reply. Replies by authors should not exceed 500 words of text and 5 references.

### 10. 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*.

### 11. Commissioned or unsolicited manuscripts

Unsolicited manuscript with publication types of original articles, case studies, essays, training materials, video clips, 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) <sup>a)</sup>	References	Tables & figures
Original article	250	2,500	20	10
Review	200	5,000	100	No limits
Case study	200	2,500	20	10
Training material	200	2,500	20	10
Essay	No	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	-	-

<sup>a)</sup>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.

### 2. Manuscript corrections

Before publication, the manuscript editor may correct the manuscript such that it meets the standard publication format. The author(s) must respond within 2 days when the editor

contacts the author for revisions. If the response is delayed, the manuscript's publication may be postponed to the next issue.

### 3. Galley proof

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.

### 8. Page charges or article processing charges

No page charge or article processing charge applies. There is also no submission fee.

### Contact Us

**Editor-in-Chief:** Kihong Kim

Department of Physics, Ajou University, 206 World cup-ro, Yeongtong-gu, Suwon 16499, Korea

Tel: +82-31-219-2584, Fax: +81-31-219-1615

E-mail: khkim@ajou.ac.kr

**Editorial Office:** Korean Council of Science Editors

Jisoo Yoon

The Korea Science & Technology Center 2nd floor,

22 Teheran-ro 7-gil, Gangnam-gu, Seoul 06130, Korea

Tel: +82-2-3420-1390, Fax: +82-2-563-4931

E-mail: kcse@kcse.org

**NOTICE:** These instructions to authors will be applied beginning with the February 2019 issue.

# Compliance of *Science Editing* to the Principles of transparency and best practice in scholarly publishing

(joint statement by COPE, DOAJ, WAME, and OASPA; <http://doaj.org/bestpractice>)

Posted in July 7, 2018 and printed in February 20, 2019

## 1. Website:

- i. The URL address of official journal web site: <https://www.escienceediting.org/>
- ii. 'Aims & Scope' statement: It is described at the masthead page.
- iii. Readership: It is primarily for scientific journal editors and personnels who works for scientific journals. Its readership can be expanded to other positions: Researchers on journal publishing and bibliometrics can get the recent topics of journal publishing and editing; Professors on communication can access and adopt a variety of data for education; Students can understand the recent trends of the journal publishing and editing; Policy makers are able to reflect the results of the articles to the nation-wide science promotion policies; The scientists are able to read the advancement in the journal to be submitted so that they have a better knowledge on the journal selection.
- iv. Authorship criteria: It is described at the Instructions to authors.
- v. Duplicate submission and redundant publication: It is described at the Instructions to authors.
- vi. pISSN: 2288-7474 eISSN; 2588-8063

## 2. Name of journal

The official journal title is *Science Editing*. Abbreviated title is Sc Ed.

## 3. Peer review process

It is described at the Instructions to authors. We adopts double-blind peer review.

## 4. Ownership and management

- i. Information about the ownership: This journal is owned by the publisher, the Korean Council of Science Editors (<https://www.kcse.org/>).
- ii. Management team of a journal
  - Journal management team (2017–2019)

- Journal Manager: Jisoo Yoon, Korean Council of Science Editors, Korea
- Manager of the Review Process: Jung A Kim, Associate Editor of *Science Editing*, Hanyang University, Korea
- Ethics Editor: Eun Seong Hwang, University of Seoul, Korea
- Statistics Editor: Yong Gyu Park, The Catholic University of Korea, Korea
- Manuscript Editors: Jae Hwa Chang, Infolumi, Korea; Jisoo Yoon, Korean Council of Science Editors, Korea
- Layout Editors: Da Hye Lee, Academya, Korea; Hyeon Jung Park, Academya, Korea
- Website and JATS XML File Producers: Jeonghee Im, M2community, Korea

## 5. Governing body

The governing body is the journal's editorial board.

## 6. Editorial team and contact information

- i. Editorial team is available from Editorial Board page at the front part of the journal.
- ii. Contact information
  - Jisoo Yoon
  - Managing editor
  - The Korea Science & Technology Center 2nd floor, 22 Teheran-ro 7-gil, Gangnam-gu, Seoul 06130, Korea, Tel: +82-2-3420-1390, Fax: +82-2-563-4931, E-mail: [kcse@kcse.org](mailto:kcse@kcse.org)

## 7. Copyright and licensing

- i. Copyright policy: All published papers become the permanent property of the Korean Council of Science Editors. Copyrights of all published materials are owned by the Korean Council of Science Editors. Permission must be obtained from the Korean Council of Science Editors for any commercial use of materials. Every author should sign the copyright transfer agreement forms.
- ii. Licensing information: This is an open-access journal distributed under the terms of the Creative Commons Attri-



bution Non-commercial license, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited for non-commercial purpose (<http://creativecommons.org/licenses/by/4.0/>).

iii. Deposit policy: According to the deposit policy (self-archiving policy) of Sherpa/Romeo (<http://www.sherpa.ac.uk/>), authors cannot archive pre-print (i.e. pre-refereeing), but they can archive post-print (i.e. final draft post-refereeing). Authors can archive publisher's version/PDF.

## 8. Author fees

Neither page charge, article processing fee nor submission fee will be applied. It is the platinum open access journal.

## 9. Process for the identification and dealing with allegations of research 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://publicationethics.org/resources/flowcharts>). The discussion and decision on the suspected cases are carried out by the Editorial Board.

## 10. Publication ethics

i. Journal policies on authorship and contributorship: It is described at the Instructions to authors.

ii. How the journal will handle complaints and appeals; The policy of the journal is primarily aimed at protecting the authors, reviewers, editors, and the publisher of the journal. If not described below, the process of handling complaints and appeals follows the guidelines of the Committee of Publication Ethics available from: <https://publicationethics.org/appeals>

- Who complains or makes an appeal?: Submitters, authors, reviewers, and readers may register complaints and appeals in a variety of cases as follows: falsification, fabrication, plagiarism, duplicate publication, authorship dispute, conflict of interest, ethical treatment of animals, informed consent, bias or unfair/inappropriate competitive acts, copyright, stolen data, defamation, and legal problem. If any individuals or institutions want to inform the cases, they can send a letter to editor For the complaints or appeals, concrete data with answers to all factual questions (who, when, where, what, how, why) should be provided.
- Who is responsible to resolve and handle complaints and appeals?: The Editor, Editorial Board, or Editorial Office is responsible for them.

• What may be the consequence of remedy?: It depends on the type or degree of misconduct. The consequence of resolution will follow the guidelines of the Committee of Publication Ethics (COPE).

iii. Journal policies on conflicts of interest / competing interests: It is described at the Instructions to authors.

iv. Journal policies on data sharing and reproducibility; Open data policy: For clarification on result accuracy and reproducibility of the results, raw data or analysis data will be deposited to a public repository after acceptance of the manuscript. Therefore, submission of the raw data or analysis data is mandatory. If the data is already a public one, its URL site or sources should be disclosed. If data cannot be publicized, it can be negotiated with the editor. If there are any inquiries on depositing data or waiver of data sharing, authors should contact the editorial office. Clinical data sharing policy: This journal follows the data sharing policy described in "Data Sharing Statements for Clinical Trials: A Requirement of the International Committee of Medical Journal Editors" (<https://doi.org/10.3346/jkms.2017.32.7.1051>). As of July 1, 2018 manuscripts submitted to ICMJE journals that report the results of interventional clinical trials must contain a data sharing statement as described below. Clinical trials that begin enrolling participants on or after January 1, 2019 must include a data sharing plan in the trial's registration. The ICMJE's policy regarding trial registration is explained at <https://www.icmje.org/recommendations/browse/publishing-and-editorial-issues/clinical-trial-registration.html>. If the data sharing plan changes after registration this should be reflected in the statement submitted and published with the manuscript, and updated in the registry record. All of the authors of research articles that deal with interventional clinical trials must submit data sharing plan. Based on the degree of sharing plan, authors should deposit their data after deidentification and report the DOI of the data and the registered site.

v. Journal's policy on ethical oversight: When the Journal faces suspected cases of research and publication misconduct such as a redundant (duplicate) publication, plagiarism, fabricated data, changes in authorship, undisclosed conflicts of interest, an ethical problem discovered with the submitted manuscript, a reviewer who has appropriated an author's idea or data, complaints against editors, and other issues, the resolving process will follow the flowchart provided by the Committee on Publication Ethics (<http://publicationethics.org/resources/flowcharts>). The Editorial Board will discuss the suspected cases and reach a decision. We will not hesitate to publish errata, corrigenda, clarifications, retractions, and apologies when needed.

vi. Journal's policy on intellectual property: All published papers become the permanent property of the Korean Coun-

cil of Science Editors. Copyrights of all published materials are owned by the Korean Council of Science Editors.

- vii. Journal's options for post-publication discussions and corrections: The post-publication discussion is available through letter to editor. If any readers have a concern on any articles published, they can submit letter to editor on the articles. If there founds any errors or mistakes in the article, it can be corrected through errata, corrigenda, or retraction.

## 11. Publishing schedule

It is to be published biannually. Supplement issues may be published.

## 12. Access

This is an open access journal distributed under the terms of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

## 13. Archiving

Is accessible without barrier from National Library of Korea (<http://nl.go.kr>) in the event a journal is no longer published.

## 14. Revenue sources

Revenue sources of journal were from the support of publisher (the Korean Council of Science Editors), Korea Government's support, and advertising rates.

## 15. Advertising

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# For reviewers

Enacted on February 20, 2019

This is a guideline for reviewers who voluntarily participate in peer review process of the journal. All of the journal's contents including commissioned manuscripts are subject to peer-review.

## Double blind peer review

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## Role of reviewers

Peer reviewer's role is to advise editors on individual manuscript to revise, accept, or reject. Judgments should be objective and comments should be lucidly described. Scientific soundness is the most important value of the journal; therefore, logic and statistical analysis should be considered meticulously. The use of reporting guideline is recommended for review. Reviewers should have no conflict of interest. Reviewers should point out relevant published work which is not yet cited. Reviewed articles are managed confidentially. The editorial office is responsible for the final decision to accept or reject a manuscript based on the reviewers' recommendation.

## How to become a reviewer

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## How to write review comments

After entering the e-submission system with ID and pass-

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