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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.

- Policy of journal editing
- Data mining on the editing and publishing
- Systematic review on medical journal publishing and editing
- Research ethics and medical ethics including clinical registration, statement of human and animal health protection, and conflict of interest
- Publication ethics: fabrication, falsification, plagiarism, duplicate publication, and authorship
- CrossCheck
- Legal issue in journal publishing
- Peer review process
- Reporting guideline for medical journals
- Medical and scientific literature databases
- Advanced information technology applicable to journal editing and publishing including PubMed Central schema, journal article tag suite schema, Digital Object Identifier, CrossMark, FundRef, ORCID, datacite, QR code, and App
- International standard of journal editing and publishing including International Committee of Medical Journal Editors' Recommendations
- Reference styles including Vancouver (NLM) style, APA style, IEEE style, and ACS style
- Digital publishing in the web and App
- Education and training of editors, reviewers, and authors
- Manuscript editing
- Journal evaluation
- Bibliometrics and scientometrics in the context of journal editing and publishing
- Finance of journal publishing
- History of scholarly journal
- Copyright and Creative Commons License
- Open access and public access approaches

Its publication type includes original articles, reviews, case studies, essays, editorials, meeting reports, book reviews, announcement, correspondences, and video clips. Other types are also negotiable with the editorial board. All unsolicited articles are subject to peer review. Commissioned articles are reviewed by the Editorial Board.

About the journal

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Training Materials

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Editorial

Academic research during and after the COVID-19 pandemic

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Albert Einstein tried hard for many years to complete the general theory of relativity which generalized his own special theory of relativity published in 1905. His effort finally paid off, and at the end of 1915, a historic paper containing Einstein's gravitational field equations was published [1]. This history is familiar to most students of physics. Yet, not so many people pay attention to the fact that 1915 was a year when World War I, which broke out in 1914, was fiercely underway in many European countries, including Einstein's homeland, Germany. Einstein's paper, despite the war, was known to physicists in many countries and particularly attracted the attention of the German physicist Karl Schwarzschild. At the time, Schwarzschild was serving on the Russian front as an officer of the German army. In his spare time during the war, he tried to solve Einstein's field equations, and for a particularly simple case, succeeded in doing so and obtained a solution which is now known as the Schwarzschild black hole. This was an important result showing the existence of a black hole for the first time. Schwarzschild wrote a paper containing this result, which was published in 1916 [2]. Meanwhile, he became seriously ill and was released from the army in March 1916. He died two months later. I think this story shows that human beings can be highly resilient and that no matter how harsh the environment is, they can do what they truly love to do.

The pandemic situation caused by the outbreak of the coronavirus disease 2019 (COVID-19) is, of course, much less serious compared to World War I. Nevertheless, COVID-19 has had a very significant impact on everyone around the world over the past year and a half and is continuing to do so. Institutes and universities were naturally affected when lockdowns were taking place around the world last year and research, especially experimental research, is presumed to have been directly affected. However, judging from the papers published during that period, it can be confirmed that academic research continued to be strong and active and the impact of COVID-19 was not so great.

Fig. 1 is a graph showing the number of papers posted on arXiv, a representative preprint site for physics and mathematics, in half-year intervals over the past five years. Meanwhile, Fig. 2 is a graph showing the number of downloads of arXiv papers during the same period. Comparing the data from the past year and a half with those before that, it is possible to notice that there has been some impact from the pandemic. Nevertheless, the numbers of submissions and downloads during that period have increased substantially compared to before. Judging from this result, I think we can say that researchers have become well adapted to the pandemic

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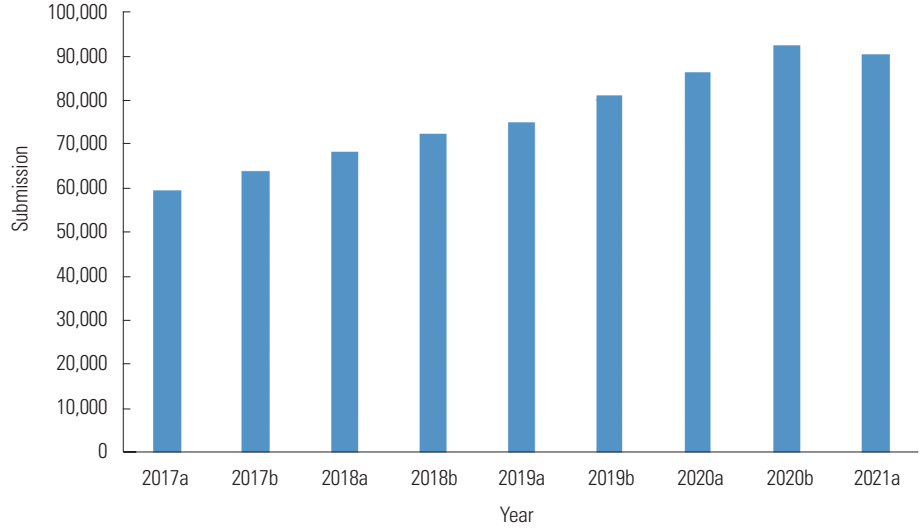

Fig. 1. Number of papers posted on arXiv from 2017 to 2021 in half-year intervals. a (b) designates the first (second) half of a year.

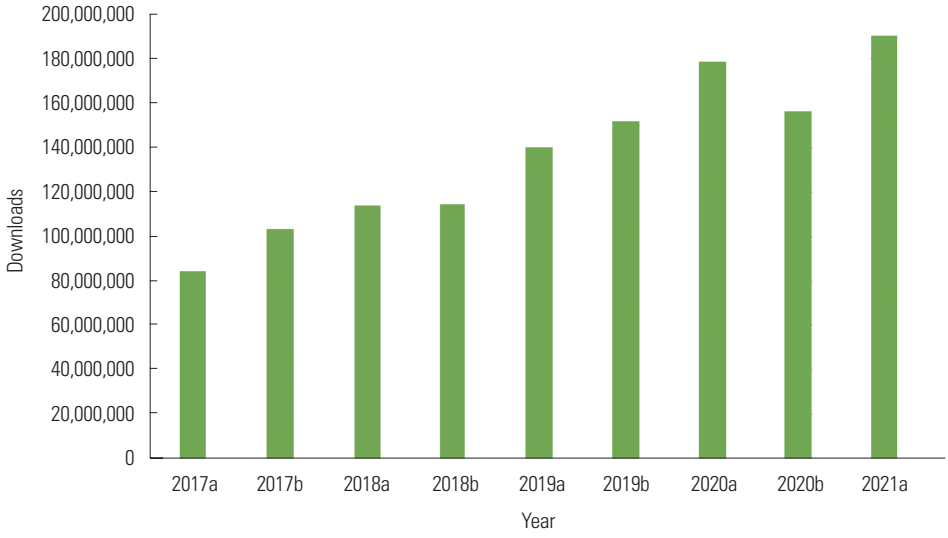

Fig. 2. Number of downloads of the papers posted on arXiv from 2017 to 2021 in half-year intervals. a (b) designates the first (second) half of a year.

situation and are conducting research activities that are not significantly different from before the pandemic. In addition, according to the recently announced 2021 Journal Citation Reports, it can be verified that the impact factors of a large number of major journals have increased significantly compared to the previous year. This result can also be an evidence that research activities have returned to normal.

In quantitative aspects such as the number of published papers, the impact of the pandemic appears to have been overcome. However, there has been some suggestion that a closer look points out that a qualitative setback in research activity, such as a decline in the proportion of researchers starting new research projects or new collaborative studies, is still continuing [3]. For obvious reasons, the organization of in-person conferences and seminars, which are a representative way of mediating the interaction among researchers, has been extremely reduced. More recently, however, online conferences and seminars have been actively held in many academic fields. These conferences often focus on highly specific topics, invite researchers from all over the world by e-mail, and are often free of registration fees. I have recently participated in several online workshops. I felt that there were not great differences from attending an in-person seminar, but rather felt that there were many advantages. It is perhaps a development

that has opened up a new chapter in academic exchange. Now researchers are able to listen to presentations, which, in the past, could only be accessed at a specific time in a specific place in a distant foreign country, easily from anywhere in the world in a comfortable environment. It is expected that this type of academic exchange will continue to expand quantitatively and qualitatively even after the pandemic is over, since many researchers would probably agree with the advantages of online seminars and meetings.

The pandemic has had a huge impact not only on research but also on education and training. Many universities in Korea are still conducting most of their classes online and it has been clear that this significantly reduces the quality of education. However, similarly to online seminars, online classes have considerable advantages as well as disadvantages and there are some portion of students who prefer them over in-person classes. As more and more people realize these advantages, the proportion of online education and training is expected to grow even after the pandemic is over. Furthermore, in the near future, the so-called metaverse technology, which will allow many human activities, including education, training, discussion, presentation, conference, etc., to be done online in a much more realistic environment, is expected to develop very rapidly. Such technological advances may change the shape of future research activities very differently from those of today.

It is beyond my capacity to accurately predict the future of society, including that of academic research. However, it is not difficult to predict that the changes to the online platform will continue and expand. In the future, academic research will continue to be active and exchanges among researchers will become more active due to the rapid expansion of online technology. I hope that all of these changes will be made in a way that maintains the essence of academic research, which is the creation and dissemination of knowledge for the benefit of human society.

Conflict of Interest

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

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Review

Artificial intelligence-assisted tools for redefining the communication landscape of the scholarly world

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Abstract

The flood of research output and increasing demands for peer reviewers have necessitated the intervention of artificial intelligence (AI) in scholarly publishing. Although human input is seen as essential for writing publications, the contribution of AI slowly and steadily moves ahead. AI may redefine the role of science communication experts in the future and transform the scholarly publishing industry into a technology-driven one. It can prospectively improve the quality of publishable content and identify errors in published content. In this article, we review various AI and other associated tools currently in use or development for a range of publishing obligations and functions that have brought about or can soon leverage much-demanded advances in scholarly communications. Several AI-assisted tools, with diverse scope and scale, have emerged in the scholarly market. AI algorithms develop summaries of scientific publications and convert them into plain-language texts, press statements, and news stories. Retrieval of accurate and sufficient information is prominent in evidence-based science publications. Semantic tools may empower transparent and proficient data extraction tactics. From detecting simple plagiarism errors to predicting the projected citation impact of an unpublished article, AI's role in scholarly publishing is expected to be multidimensional. AI, natural language processing, and machine learning in scholarly publishing have arrived for writers, editors, authors, and publishers. They should leverage these technologies to enable the fast and accurate dissemination of scientific information to contribute to the betterment of humankind.

Keywords

Artificial intelligence; Machine learning; Peer review; Scholarly publishing; Science writing

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Introduction

The term artificial intelligence (AI), first coined in 1956 by John McCarthy—known as the father of AI [1]—is widely described now as any thoughtful application of advanced computer sciences in executing tasks and processes that are usually related to intelligent beings [2]. Across industries, the world's nations are in a rapid race to scale up their AI capacity. A 2019 Accenture report found that over 80% of 1,500 executives representing 12 technologically developed economies were aware of AI's potential in attaining development objectives [3]. Three-fourths of them contemplate losing business if AI is not implemented and scaled by 2024. According to "The state of AI in 2020" report, the recent coronavirus disease 2019 (COVID-19) pandemic has not prevented high-performing organizations from investing in AI [4].

In another study of 2,700 professionals from seven developed countries, Boston Consulting Group observed that China was the emerging leader on the path to an advantage in the AI field, with 85% of organizations either piloting or implementing AI. China excels and surpasses many developed countries in the duel of AI adoption in niche sectors, including healthcare, technology, and publishing [5].

AI is expected to have a tremendous influence on publishing, an age-old industry. It may help develop "smart publishers" by aiding humans to accomplish complex editorial tasks, such as analyzing large quantities of data, making predictions and forecasts, suggesting decisions based on real-time information, and continuously amplifying performance [6]. With the emergence of new service providers and the unveiling of unique technical add-ons to existing platforms, AI is becoming a noticeable sensation also in scholarly and academic publishing [7]. The first-ever pilot prototype publication of a machine-generated science book became a reality in 2019 [8].

In the scholarly publishing space, AI-based algorithms have enabled the innovative exploration of scientific content and help redefine the role of science communication experts in the years to come. The editor-in-chief of a medical journal with more than 100 volumes published to date intriguingly proposed that "writing machines" will draft scientific manuscripts in the imminent future, while "reviewing machines" will appraise them [9]. Reducing human errors and meeting stringent timelines are vital targets for the success of scholarly publication projects. AI tools can help overcome obstacles that publication professionals currently encounter. AI has the latent potential to unravel these challenges by considerably decreasing the time and efforts expended on simple, monotonous, least-impact, routine tasks and providing extended time to think, explore, and work on multifaceted scholarly processes [10].

A 2019 multinational survey of around 300 senior leaders and editors (mean age, 41 years; mean experience, 13 years) from 17 countries analyzed the challenges and benefits of using AI in media and publishing houses of general interest [11]. There were also several takeaways for the scholarly community. Some key results, such as increased readability, easy navigation, enhanced content discoverability, improved decision-making, automated complex processes, compliance with standards, and reduced human workload, are crucial for introducing aspects of AI in scholarly publishing. However, the cost factor would be the most significant hurdle for small publishers and standalone journals, although monetary benefits are apparent even for minimal AI investments.

Although AI has attained attention-grabbing predictions for its potential to serve as a "research advisor" [7], the familiarity and understanding of its role in healthcare remain in the nascent stage; only 60% of respondents in a recent survey were acquainted with this technology [12]. It is more likely for the scholarly communications universe that a significant proportion of science and medical writers across the globe may not be "AI-literate". Knowledge and awareness of AI-supported innovations are essential even for other stakeholders, such as publishers, editors, reviewers, and readers.

In this article, we have listed and summarized various AI and other associated tools currently in use or development for a range of publishing obligations and functions that have brought about or can soon leverage much-demanded advances in scholarly communications. This detailed review focuses on the contributions of AI to various scholarly publishing tasks, such as literature review, information retrieval, systematic data syntheses, manuscript development (writing, editing, and revising), bibliography and citation management, target journal selection, plagiarism prevention, peer review, quality assessment, editorial workflow management, and publication production (including proofreading and dissemination).

Literature Search and Information Retrieval

A literature review forms the base of any publication project involving evidence-based research. According to the AI-powered *Dimensions* tool, 5,670,475 articles were published in 2019 and 6,166,992 in 2020 [13]. Roughly 20% of science journal articles come from China [14]. With the ever-increasing number of research productions, particularly in today's infodemic era, data handling has become a cumbersome, tiring, and time-consuming task. AI excels at extracting signals from large volumes of noisy data and may help us find key information from the expanding academic literature.

A fascinating product, *COVID-19 Primer*, uses intelligent natural language processing (NLP) to mine databases and gen-

erate daily research output trends. As of April 3, 2021, slightly over a year after the pandemic outbreak, more than 127,000 research papers have been published about COVID-19 itself [15]. The retrieval of accurate and sufficient information is thus desirable to achieve milestones. AI-assisted search engines may empower transparent and proficient data extraction tactics; for instance, tools like *COVIDScholar* and *CLARA* help learn about COVID-19 related research information [16,17]. A recent hackathon-style randomized controlled trial (RCT) concluded that an AI-led review of medical literature could result in "focused searches" [18]. However, complying with adequate standards in using NLP and machine learning (ML), such as goodness-of-fit measures, cross-validation procedures, and sensitivity and specificity thresholds for search classification, are fundamental to obtain reproducible, dependable, and precise search results in comparison with conventional searches [19]. In particular, ML approaches can struggle when the structure of the underlying data is not consistent.

Semantic Scholar uses AI to mine the information available in published articles and provides users access to supplementary information to reproduce the results [20]. *Wizdom.ai* from Taylor & Francis deep-searches journal databases and connects data from various domains and concept areas [21]. *Iris.ai* follows a distinct strategy by sorting topic-based contents in the CORE database (with over 134 million research articles), amalgamating three different algorithms to generate "document fingerprints," and then positioning the results based on relevance. Another tool from the same team, the blockchain-based *Aiur*, may understand the published content, compare it with other similar publications, and check and authenticate hypotheses [22]. *Omnity*, a multilingual AI tool, helps in the semantic data extraction of scholarly articles and patents in over 100 languages [23]. *GrapAL* applies NLP principles to a Neo4j graph database to identify inter-domain connections and generate citation-based metrics [24].

Marshall and Wallace [25] list several notable AI-based tools that are in use for systematic review automation: *RobotSearch* and *RCT Tagger* for filtering RCTs; *Thalia* for the conceptual search and indexing of PubMed articles; *RobotAnalyst* and *SWIFT-Review* for obtaining topic-modeled search results; and *ExaCT*, *RobotReviewer*, and *NaCTeM* for data mining and automatic extraction of data elements. *RobotReviewer*, the ML-based evidence synthesis tool, automatically identifies critical RCT information, including the PICO (population, intervention, comparison, and outcome), design, and risk of bias, from research publications. *Scholarcy* provides meaningful AI-created summaries for research articles. This helps authors and science writers quickly understand the essential study-related information, such as settings, population, and findings [26].

The use of semantic search in literature review goes beyond text-based approaches. *SourceData* looks for figures and legends in research publications, extracts metadata, compares and connects to similar images, and generates a "searchable knowledge graph". It helps connect the traditional visual and textual account of research results to an ML-assisted depiction of data and hypotheses [27].

Fig. 1 portrays various AI tools and certain associated non-AI solutions that help scholarly publishing stakeholders simplify their tasks and excel in different functions.

Manuscript Preparation

"Writing robots" have made their way into mainstream journalism and literary creation in China. In 2019, Zhao et al. enumerated several Chinese robotic writing tools that include *Dream Writer* (Tencent News), *Kuai Bi Xiao Xin* and *Inspire* (Xinhua News Agency), *Xiao Ming Bot* (Beijing Byte Jump Technology Co., Ltd), *A Tong* and *A Le* (Guangzhou Daily), and others. These tools perform independent "robot journalism" by generating reports based on structured data (original writing) and creating entirely new content by mixing up and rewriting existing stories (creative writing) [28]. AI algorithms develop summaries of scientific publications and convert them to plain-language texts, press statements, and news stories [29,30].

Recent NLP breakthroughs, particularly the development of transformer language models, have significantly enhanced the output quality that AI algorithms can generate. The exact nature in which AI-generated text is combined with human input is still being defined.

Several AI-backed writing assistant tools have recently emerged in the market. They are widely diverse in their scope (such as medical, marketing, legal, business, academic, and scholarly writing) and scale (fully augmented, semi-automated, and simpler bots). G2, a software reviewing portal, has scored 39 such tools with varying scopes, including *LightKey*, *WordAi*, *After the Deadline*, *PerfectTense*, *Writer*, and *AI Writer* [31]. A few tools serve as "writing platforms", which authors and writers use to develop content. The others are mere checkers and bots that support writing activity outside their platform by suggesting modifications.

Interestingly, like the highly-rated *Grammarly*, some products have extensively been used in academic settings and scholarly research with positive feedback [32]. *PerfectIt*, another example, can be customized to suit any in-house style. Besides regular grammar checks, it focuses on abbreviations, style guides, and consistency in table/figure order and headers [33]. *ProWritingAid* serves as a grammar checker (including avoidance of overused words and suggestion of word combi-

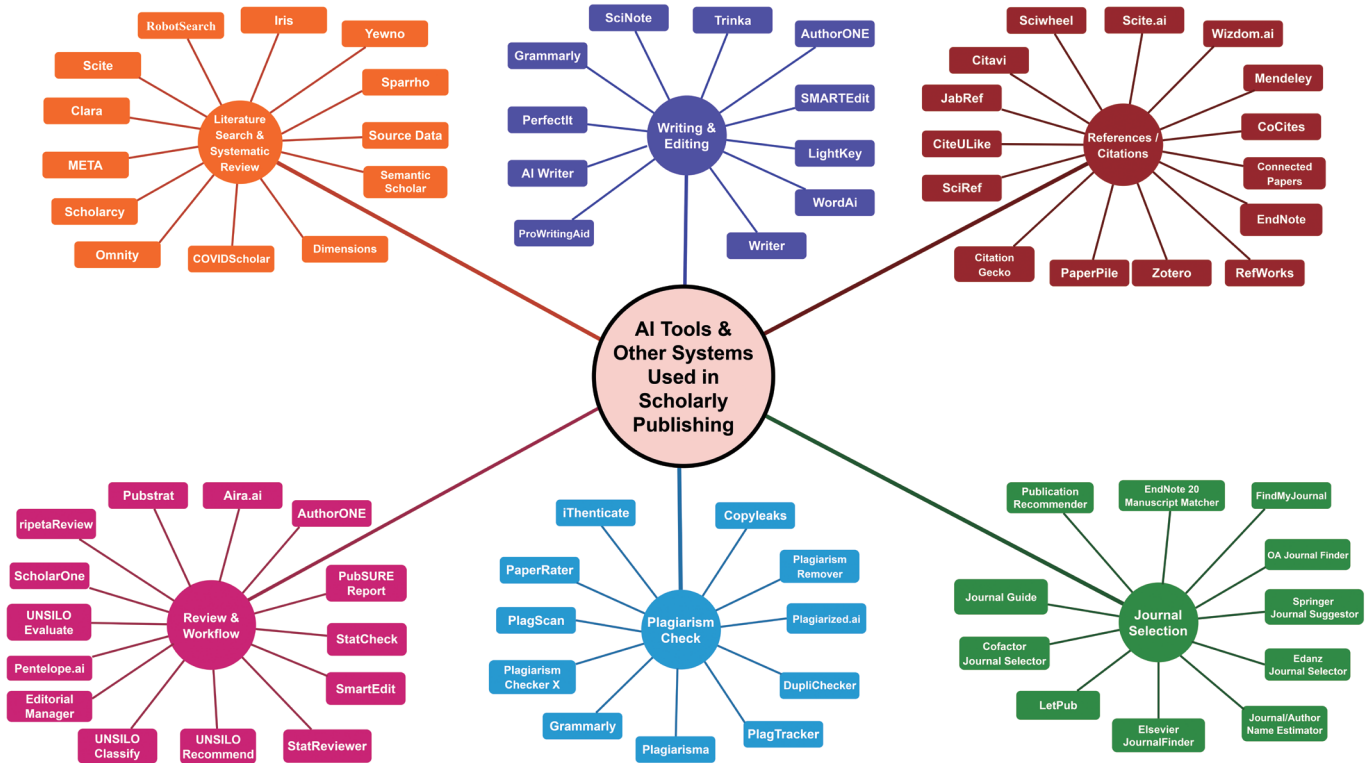

Fig. 1. Various artificial intelligence (AI) tools and associated non-AI solutions used in scholarly publishing.

nations, repeats, and echoes), a style editor (including structure, length, and transition), and a "writing mentor" (providing tips for readability and consistency). It combines recommendations, texts, audio-visuals, and quizzes to make writing entertaining and interactive [34].

Trinka, developed by Crimson.ai, is specially designed for academic and technical writing. Beyond its functions in correcting grammatical errors, it helps authors develop submission-ready documents. It auto-edits documents and provides corrections in track-changed versions. In addition to consistency checks similar to *PerfectIt*, *Trinka* offers a publication-readiness review [35]. *AuthorONE*, Crimson.ai's other flagship product, performs a comprehensive assessment by checking over 60 items to finalize a submission-ready draft [36]. *SciNote Manuscript Writer* extracts data from references using keyword search and adds them to the draft adequately cited and annotated. Although the tool provides intellectual content for writing literature-based sections like introduction, the most creative and crucial part of the manuscript, the discussion section, requires a human touch [37].

Bibliography and Citation Management

The use of recent, relevant, and quality references is pivotal for a good science publication. Nonetheless, preparing the references section and checking the accuracy of in-text citations often becomes tedious for a busy researcher. AI applications render much help in this domain. They are even capable of influencing citation patterns [38]. *Wizdom.ai* comes with an in-built AI-strengthened "citation recommender." With the power of intelligent analytics backed by big data, this tool is developed to showcase a research article's "projected citation impact" for 3 to 5 years. It can also highlight emerging research areas and concepts in various science domains and visualize evolving trends [21].

Scite.ai is an ML platform that uses a "smart citation" feature to analyze the quality of references and list publications with editorial notices, errors, retractions, or disputes. It helps researchers understand scholarly citation practices by revealing the citation's milieu and providing evidence with supporting or disputing contexts. *Scite.ai* has recently been introduced as a plug-in for *Zotero*, a reference management tool [39]. *SciWheel* uses a similar "SmartSearch" algorithm to recommend relevant articles in Microsoft Word and Google Docs plug-ins [40]. Tools like *CoCites*, *Citation Gecko*, and *Connected Papers* identify research publications by two innovative, unconventional methods named "co-citation" (two research articles appearing together in a single reference list) and "bibliographic

coupling" (two papers citing a single publication) [41]. *Connected Papers* suggests prior and derivative works of input papers and builds a visual graph of related publications, which is of great use in research fields with evolving and novel developments (e.g., AI or COVID-19) [42]. *Meta*, one of the leading literature search portals, employs predictive algorithms to identify relevant papers, rank them by eigenvector centrality, and automatically integrates with the *Mendeley* reference manager [43].

Automation features in *EndNote 20* include deduplication of articles, bulk reference updates, auto-import of files, metadata extraction from imported files, and categorization of files into groups [44]. The other leading names in reference management do have their share of intuitive value additions that simplify referencing and citations—*Citavi* automatically adds citations and thus prevents plagiarism, *JabRef* automatically renames and sorts related files as per the user's rules, and *CiteULike* has an automated publication recommendation feature [45-47].

Target Journal Selection

Choosing the right journal is a challenging task, mainly because of the influence of various factors, such as the existence of too many journals, high rejection rates in reputed journals, and the substantial emergence of the predatory market. An estimated 30,000 scholarly journals are published annually [48]; fishing the right one out of this colossal ocean requires fulfilling multiple criteria and applying thoughtful selection strategies. On the contrary, web-only, open access (OA) journals tend to disappear from the online space. A recent preprint reported that some 174 journals vanished between 2000 and 2019, raising concerns over preserving research information for a longer time [49]. Digitalization, particularly the OA model, has also been accused of bringing more predatory players who do not follow good publication practices. Duc et al. [50] warned of the penetration of predatory journals even in popular databases like Web of Science, Scopus, and PubMed.

Selecting a good journal is thus a serious obligation with long-term implications for publishing laborious research work and must follow a thorough checking of various key factors: scientific rigor, transparency in editorial and peer review process, policies on different editorial functions, reputation, and impact [51]. Many renowned journals have high rejection rates—reaching as high as 97% [52]—making the target journal selection process an arduous task for researchers and authors. An appropriate journal for a manuscript is chosen based on the merit of the written manuscript. AI-based interventions thus have a role to play, although there are plenty of simple, straightforward web-based solutions on the market (Fig. 1).

OA Journal Finder from Crimson.ai follows a search algorithm using a "validated journal index" supported by the DOAJ (Directory of Open Access Journals) and avoids predatory journals [53]. The company's other tool, *FindMyJournal*, employs an intelligent algorithm to search a large pool of journals (over 29,000 journals) using researchers' responses to 11 objective questions and suggests the top five journals for submission [54]. The "manuscript matcher" function in *EndNote 20* applies complex algorithms, Web of Science information, and statistics from Journal Citation Reports to suggest impactful journals by providing the "match score" to shorten the target journal search. This value-added search option is also integrated with the *EndNote 20's* Microsoft Word plug-in, "cite while you write" [55]. Elsevier's *JournalFinder* involves clever search know-how supported by the in-house built "fingerprint engine" and subject-specific vocabularies to identify the correct journal choice [56].

Plagiarism Prevention

Plagiarism was first believed to be reported during 40 to 140 AD, when Fidentinus, a Roman poet, recited a poem penned by Martial without the latter's acknowledgment [57]. Since then, the act of plagiarism has evolved beyond a mere copy-paste issue. In the digital era, manual plagiarism detection is not viable. The introduction of trouble-free access to online sources has made it easy for researchers, especially in their early career and from non-English speaking communities, to commit plagiarism, resulting in academic disrespect, credibility damage, manuscript retractions, and a compromised reputation [58].

The use of general web crawlers and search engine optimization tools may not be sufficient for checking plagiarism in academic and scholarly publications. The availability of several text-modification tools has even made things worse by helping authors to evade plagiarism detection. Similar to the role of innovative writing assistants, AI-powered algorithms and tools can help detect plagiarism, as they outweigh general web crawlers by identifying content similarity at different levels with the assistance of cloud computing and big data [59, 60].

Exciting studies and promising results are emerging in this domain; highly-capable AI solutions are being designed to tackle the infiltration of plagiarism in scholarly publishing [61]. Some novel tools detect plagiarism in multiple languages, bar chart images (using optical character recognition), and paraphrased contents [62,63]. Sahu [64] used the k-nearest neighbor algorithm, an ML method, to recognize patterns and identify plagiarized content based on similarity. Chitra and Rajkumar [65] developed an ML-based paraphrase rec-

ognizer that could extract lexical, syntactic, and semantic information from texts, with a favorable outcome in passage-level searches.

CopyLeaks, also powered by ML, helps detect plagiarism in over a hundred languages [66]. *Plagiarism Rater* applies NLP principles to parse and extract textual content [67]. *Ithenticate*, a market leader in the scholarly publishing space, provides a side-by-side comparison of text content and source materials and presents a "similarity index" as a percentage, indicating the amount of copy-pasted matches [68]. Interestingly, writing assistants like *Grammarly* and *ProwritingAid* also have plagiarism checking features [32,34].

There have been suggestions to implement AI-supported stylometry to detect plagiarism as each author has his or her own "writing fingerprint" [69]. Despite the novelty of this concept, it may only be suitable for academic writing or scholarly publications with a single author. Manuscripts with multiple authors may involve feedback from all stakeholders, and thus a stylometric analysis may not be feasible.

Peer Review and Quality Assessment

The ever-increasing demand for peer reviewers has caused a "review imbalance" in the scholarly publishing domain. According to a 2016 report by Kovanis et al. [70], over 90% of review tasks are handled by only 20% of researchers. The COVID-19 pandemic has further highlighted this gap and stressed the need to streamline and complement the existing review process, primarily due to the need to repurpose drugs for new treatments. The role of NLP-driven AI in peer review is thus considered highly significant, as it can perform feature- and profile-based matching of reviewers and involve a bias-free selection of potential reviewers [71,72].

AIRA from Frontiers has become one of the first AI-supported tools used for peer review of scholarly manuscripts; it reviews and recommends 20 suggestions for grammar and style, figures and legends, and plagiarized content, apart from providing warning about conflicts of interest [73]. *PubSURE Report*, an AI-backed assessment tool trained with millions of published articles, can examine for "reporting hygiene" related to readability, adherence, and comprehensiveness [74]. *ripetaReview* performs similar checks in addition to inspecting "reproducibility variables" and analysis methods [75].

Ghosal et al. [76] proposed an automated system to assist editors in decision-making by weighing the merit of a submitted manuscript using trained ML classifiers. Mrowinski et al. [77] used Cartesian genetic programming to develop an artificially evolving method that reduces the peer-review time by about 30% without increasing the reviewer base. Nevertheless, automated peer review systems, trained with the previously accepted manuscripts of any particular journal, can pose possible "in-built biases" [78].

In 2013, Nuijten et al. [79] assessed the statistical quality of manuscripts published in eight psychosocial journals over the previous 28 years. The results revealed that at least half of them had statistical errors, with serious faults in one of eight papers. This encouraged the group to develop *StatCheck*, an exclusive tool to help psychology journal editors detect statistical errors in submitted manuscripts. *StatReviewer*, another decision support tool integrated into *Editorial Manager*, examines the use of correct statistical approaches in manuscripts and helps recognize deceitful conduct. It checks for obvious numerical errors and highlights concerns related to quality, style, and reporting methodology [80].

Editorial Workflow and Publication Production

Kim et al. [81] compared nine manuscript management systems concerning authors, reviewers, and editors' viewpoints on various areas such as registration, authority control, file uploading, input keyword, input metadata, and review process communication. They suggested improvements in functionality and highlighted the need to simplify editorial tasks at multiple levels.

A survey of editorial offices by UNSILO.ai claimed that over 85% perform pre-review technical checks, and over 65% manually cross-verify details between forms and manuscripts submitted [82]. This AI player has introduced an innovative tool, *UNSILO Evaluate*, which is integrated into *ScholarOne*, the leading editorial workflow management system from Clarivate Analytics, to conduct technical checks at manuscript screening and reduce the substantial time and efforts invested into this process [83]. Even publishers that use in-house submission and workflow management systems, check and correct references in submitted manuscripts using its AI-supported auto-analyzer tool [84]. *Penelope.ai* has the same functionality and matches a journal's specific requirements for references [78]. *AuthorONE* checks authorship declarations, ethical compliance, inclusive language, and word count reduction [36]. *Pubstrat* features automated workflow management alongside an option for automated citation creation [85].

Meta's bibliometric intelligence, which is integrated into *Editorial Manager*, applies ML algorithms (trained on its corpus of scientific collections) and estimates the "future citation count" of a newly submitted manuscript. This helps editors to choose priority manuscripts and allows for triaging and ranking. Interestingly, in extensive studies, *Meta's* bibliometric intelligence out-performed (by 2.5 times) pre-publication impact prediction by editors [86]. Cenveo Publishing uses NLP in its *SmartEdit* tool for copy editing and proof generation

and rationalizes the production process by converting texts into XML format [87].

UNSILO.ai's other products help publishers in production and post-publishing activities; *UNSILO Classify*, through its ML technology, helps develop topic-based content packages, while *UNSILO Recommend* offers content recommendation features to improve click and retention rates [88]. ML can enhance post-publication discoverability by providing high precision recommendations [89].

Publishing houses in China use AI to design layout, format contents, choose and acquire the right images, annotate, identify speech and objects, and index [90]. Similar principles are being applied in scholarly publications, wherein journal-specific formatting, an overburdened process, can be managed using automation to prevent irregularities possibly missed due to human oversight [91]. However, automated proofreading tools may not be free from inaccuracies [92].

Future Prospects

The recent decades have seen a soaring number of articles published, unquestionably urging stakeholders to adopt AI in the future [93]. Predatory OA journals with low article-processing charges and rapid dissemination in online platforms not only malign academic integrity, but also add compromised content to the vast existing pool of scholarly articles [94]. The COVID-19 pandemic has exacerbated this scenario further, with about 367 pandemic-related articles published per week with a 6-day median lead time to acceptance (vs. 84 days for other topics) [95]. There are two crucial paths forward for AI: prospectively improving the quality of publishable content and adopting retrospective checks for existing content in the public domain to identify missed obligations and correct them for better use [96]. As discussed in various sections of this manuscript, ML is certainly not new to scholarly publishing. Content enrichment and algorithm-based searches are two niche areas of semantic technology that can yield enhanced search discoverability, transforming scholarly information into a technology-driven industry that would highly depend on big data and ML [97,98].

Conclusion

AI has a long trail to cross in this intellectual domain, as it has to find a suitable position in mimicking more, but not all human-only characteristics [93]. Currently, there are various AI-based product choices for scholarly publishing, but the availability of too many products itself may confuse end-users about opting for the appropriate ones.

Palmer [99], a prominent business consultant and one of LinkedIn's top 10 technology experts, warns that report writers, journalists, and authors may have to give their jobs to robots soon. There may be hesitancy among professionals in accepting innovation and changes for fear of job loss. Interestingly, history could remind us of similar predictions and warnings when attempts were made to use typewriting machines to replace handwritten materials or when the publishing world slowly moved from paper to online platforms. Hence, change is permanent, but the impact would be on how fast the scientific community adapts to advanced AI technologies. More importantly, the results of the 2019 Gould Finch and Frankfurter Buchmesse's survey [11] have discredited the assumption that AI will take over the job roles of writers and editors. The authors of that survey report are convinced that AI implementation does not result in job cuts; instead, it reinforces and supports the human workforce. This is a prime period to promote human-machine collaboration through training and preparation to augment value creation and improve performance and delivery.

Conflict of Interest

No potential conflict of interest relevant to this article was reported. The opinions provided in this manuscript reflect the authors' personal views and do not represent that of their affiliated organizations.

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Original Article

Korean researchers' motivations for publishing in data journals and the usefulness of their data: a qualitative study

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Abstract

Purpose: This study investigated the usefulness and limitations of data journals by analyzing motivations for submission, review and publication processes according to researchers with experience publishing in data journals.

Methods: Among 79 data journals indexed in Web of Science, we selected four data journals where data papers accounted for more than 20% of the publication volume and whose corresponding authors belonged to South Korean research institutes. A qualitative analysis was conducted of the subjective experiences of seven corresponding authors who agreed to participate in interviews. To analyze interview transcriptions, clusters were created by restructuring the theme nodes using Nvivo 12.

Results: The most important element of data journals to researchers was their usefulness for obtaining credit for research performance. Since the data in repositories linked to data papers are screened using journals' review processes, the validity, accuracy, reusability, and reliability of data are ensured. In addition, data journals provide a basis for data sharing using repositories and data-centered follow-up research using citations and offer detailed descriptions of data.

Conclusion: Data journals play a leading role in data-centered research. Data papers are recognized as research achievements through citations in the same way as research papers published in conventional journals, but there was also a perception that it is difficult to attain a similar level of academic recognition with data papers as with research papers. However, researchers highly valued the usefulness of data journals, and data journals should thus be developed into new academic communication channels that enhance data sharing and reuse.

Keywords

Information dissemination; Data journal; Data paper; Motivation; Publishing

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Introduction

***Background/rationale*:** With the development of infrastructure capable of processing large-capacity data, the integration and analysis of data from different disciplines have brought about remarkable scientific advances. The relaxation of restrictions on proprietary scientific data has led to the identification of connections between previously hidden scientific patterns through the revitalization of new data-driven approaches and advanced collaboration [1]. Initially, re-

searchers expressed concern about the lack of incentives for data sharing and did not actively participate in it; however, their interest has increased as research funding agencies such as the US National Science Foundation (NSF) publicly announced policies related to data management and sharing public research results [2].

Until now, academic journals that share processes and analysis results related to research topics have been at the center of academic communication in the field of science and technology. However, with the recent emphasis on the importance of data sharing and reuse, data journals have emerged as a new channel for this purpose. Data journals publish data papers that describe facts about data, such as data collection methods and data features, and the described data are disclosed and maintained in data repositories [3]. In data journals, data and data papers are shared in a citable format through a peer-reviewed quality assurance process so that they can be recognized as research achievements [4,5]. In this respect, data journals have emerged as a new medium for sharing and managing data. Data journals must consider variety of factors, such as the context of research data collection, the description of data collection, and the establishment of infrastructure for the organization, verification, preservation, and reuse of data. In addition, standardization of technology related to data sharing should be a prerequisite. Data journals share an emphasis on the appropriateness of data production methodology and detailed descriptions during the peer review process [6]. Data journals ask authors to provide information on aspects of data production, such as the data collection, data producers and related projects, and data identifiers [7].

The publication of data journals and related research initiatives are actively underway, primarily by publishers and academic societies [4]. As the open science movement has emerged in the research environment, research data have received more attention. For scientific integration and reproducibility, research data have begun to be shared more frequently [8]. This phenomenon has also increased the value of data journals. However, very few studies have investigated the perceptions or experiences related to data journals from researchers' perspectives [9].

***Objectives*:** The purpose of this study was to elucidate the usefulness and limitations of data journals. Qualitative exploratory research was conducted on motivations for submission, review and publication processes, data sharing, obstacles, and differences from existing academic journals according to researchers with experience publishing in data journals.

Methods

***Ethics statement*:** The interview data collected in the study were recorded with consent in compliance with research ethics concerning personal information protection. The collected data were used for research purposes only, and voice recordings were converted into transcripts and used as basic data for this study.

***Study design*:** This qualitative study was conducted to examine researchers' motivations for, and experiences with, submitting to data journals. The study was described according to the SRQR (Standards for Reporting Qualitative Research) guideline [10].

***Researcher characteristics and reflexivity*:** The researchers are experts in library and information science with more than 15 years of research experience.

***Context*:** Interviews in the form of questions and answers were conducted based on a semi-structured questionnaire (Appendix 1), and the data were analyzed using semantic unit coding and clustering.

***Sampling strategy*:** In order to evaluate the representativeness of researchers who submitted data papers, the 79 data journals indexed in Web of Science were screened to find potential research subjects. Among them, we selected four journals in which data papers accounted for 20% or more of their publication volume (*Data in Brief* 94.5%, *Scientific Data* 77.9%, *Data* 44.3%, and *GigaScience Data* 22.17%) with corresponding authors affiliated with South Korean research institutes.

***Data collection methods*:** Emails were sent to a total of 98 corresponding authors from July 24 to October 15, 2019, and a total of seven research subjects were selected for interviews after three rounds of correspondence. The interview questionnaire consisted of five items (Appendix 1) related to their motivations for publishing a data paper, the necessity of data papers, obstacles related to data paper publication, data sharing, and the possibility of founding a data journal in Korea.

***Data collection instrument and technologies*:** Face-to-face and telephone interviews were conducted, with each interview lasting for an average of approximately 58 minutes (Table 1).

***Units of the study*:** As presented in Table 1, the seven subjects included four university professors and three researchers from governmental research institutes. From the interviews, it was found that they all held PhD degrees and had served as reviewers for international journals. All the participants except one were male, and most interviewees had conducted research in fields related to biological sciences or medicine, such as immunology, medical engineering, bioinformatics, or biochemistry.

***Data processing*:** The contents of the interviews were converted into a transcript, and responses were categorized by theme using Nvivo 12, shown in Fig. 1.

***Data analysis*:** Content analysis was performed by creating group clustering while coding for restructuring relevant

Table 1. Background of interviewees, interview modality, and interview duration

ID	Affiliation type	Position	Gender	Research disciplines	Interview modality	Interview duration
P1	University	Associate professor	Man	Immunology of infection	Telephone	38 min
P2	University	Assistant professor	Man	Medical engineering and technology	In-person	1 hr 17 min
P3	Governmental research institute	Researcher	Man	Biomedical informatics	In-person	1 hr 17 min
P4	University	Assistant professor	Man	Electrical and electronic engineering	In-person	54 min
P5	University	Full professor	Man	Biological engineering	In-person	56 min
P6	Governmental research institute	Senior researcher	Man	Biology	In-person	1 hr 2 min
P7	Governmental research institute	Director	Woman	Biochemistry	Telephone	41 min

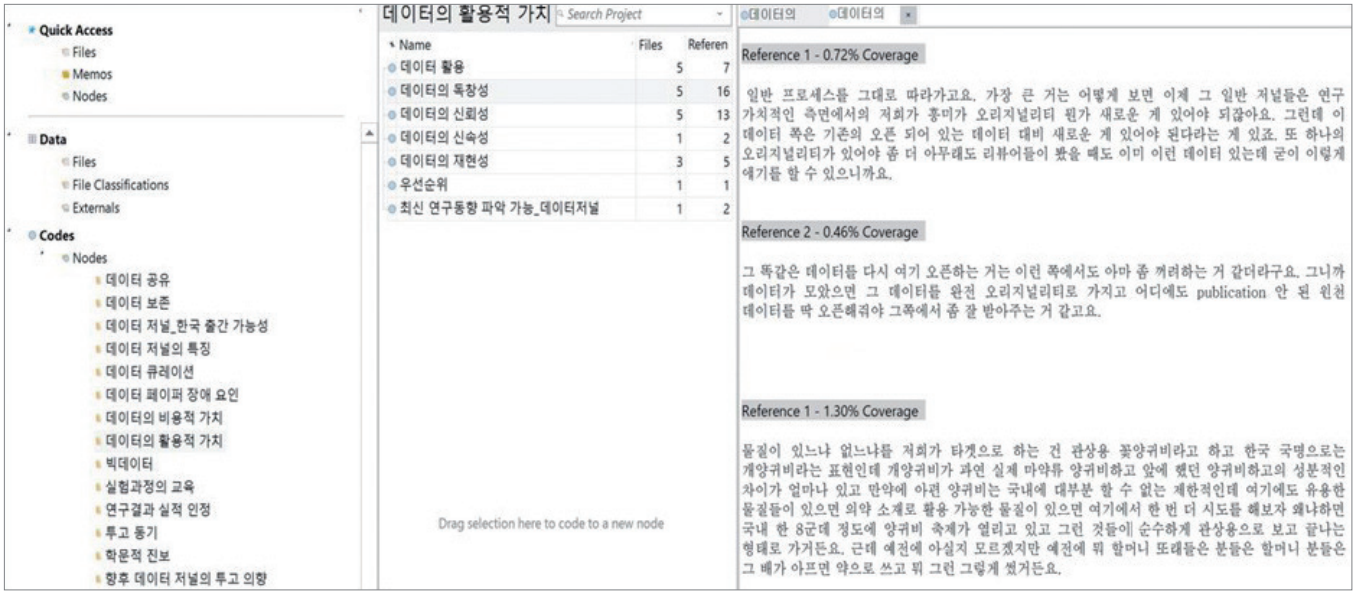

Fig. 1. Data coding and clustering process using Nvivo 12.

theme nodes. In order to evaluate the reliability and validity of the study, cross-analysis between researchers was performed. Based on the results of coding performed by two coders for 15% of the total interview data, intercoder reliability was measured using Cohen's kappa and was found to be 0.718, which is within the range of substantial reliability [11].

***Techniques to enhance trustworthiness*:** No further process was implemented.

Results

Synthesis

The value of data

Researchers who contribute to data journals support the economic, practical, and educational values of data. The tremendous budgets dedicated to research result in large swaths of data such as original data sets and image data. The high degree of economic investment allocated for the discovery of rare resources as well as the production, collection, and analysis of original data should be shared and used as data sets, and further scientific progress should be made through interdisciplinary research. Research data can be reused through accurate interpretations and analyses. To this end, in addition to an explanation of the data, data quality and data standardization must be considered, and data verification must be performed. Since data journals verify the reliability, validity, accuracy, and reproducibility of data through the review process, the reusability of data sets is increased. As such, data journals curate verified data, produce detailed descriptions of the data collection process and experimental methods in data papers, and, at the same time, provide data free of charge so that other researchers can use them universally. As such, data papers that contain detailed descriptions of research data and reproducible experimental methods have intellectual value since they can set precedents with regard to protocols related to experimental data for use by subsequent researchers (Fig. 1).

The value of data journals as research achievements

Disclosure of original and valuable research data to the academic community became possible because data produced by researchers using data journals are considered academic research achievements for the purposes of annual performance evaluations. Unconditional disclosure of data in the highly competitive science and technology field can be undesirable since researchers lose their monopoly power over data and research results. Important and original data derived from the research process are typically intended to be disclosed after the research achievements are recognized.

I plan to conduct follow-up research with this data, but if I disclose the data, others can proceed with research. Then the research will no longer be as valuable for me. (P2)

Data journals are recognized as academic achievements in the same way as conventional academic journals. The submission and review processes of data papers are not different from those of other types of academic papers, and special emphasis should be given to the handling and processing of the results of data collection.

The reasons why the researchers submitted to data journals were as follows: first, they submitted to conventional academic journals but received a recommendation from reviewers to submit their manuscripts as data papers; and second, they submitted data papers after learning that the editorial committee would publish a special edition or a data note section.

There were a few parts that were slightly unorganized, so after being told to submit a data note rather than an article, I organized them and submitted it all at once. A reviewer recommended it. (P6)

Thus, the biggest motivation for researchers to submit to data journals was to receive recognition for their research achievements. In particular, researchers in South Korea are pressured to publish their research results in a short period of time in journals with high impact factors due to annual appraisals conducted by universities and research institutes. Data journals increasingly present an alternative for receiving academic credit since they allow researchers to present review results and draw research conclusions relatively quickly. However, researchers considered it somewhat disappointing that more significant research achievements could not be obtained using this method, since it left less time for analysis and discussion.

It could have been published in a high-ranking journal if the data had been analyzed well, but I had to produce achievements quickly, which was one of the reasons I chose the data journal. (P6)

The researchers were also concerned that, even if the impact factor of a data journal was high, the paper could be disparaged as presenting results of no research value and viewed as "just a collection of data." Although data papers are valuable in that they promote data sharing and utilization, it was also pointed out that it is not likely for them to be recognized as an achievement that replaces traditional research papers published in existing academic journals. In particular, for researchers with master's or doctoral degrees applying for research positions, it was considered desirable to prove their research ability with research papers published in academic journals and present data papers as supplementary research achievements.

That's what I tell my students. This is a data paper, not a research paper, so it may be considered valuable later, but it can be a bit of an issue if you put this as a representative performance, for example, and do something with it later just because the impact factor of a data journal is high. (P2)

The quality and specialization of data journals are gradually being improved, and data journals that initially received a wide variety of data are gradually beginning to favor more meaningful data. In addition, in the case of fields with rapid technological development, data are gathered specifically for data papers and researchers tend to be aware of the latest research trends related to data papers.

In the case of GigaScience, various data were received, but these days they do not accept any data that are not meaningful. (P6)

Repository for data sharing and preservation

When submitting to data journals, authors submit data to data repositories at the same time as they submit data papers. Repositories aim to standardize data, build architecture and infrastructure for the data, and share data [2]. Each publisher has different policies for repositories; publishers' internal repositories or general-purpose or specific subject area repositories are recommended. Since data in repositories becomes openly available at the time of publication, repositories are essential components of infrastructure for data sharing and preservation related to data journals.

Traditional academic journals also recommend sharing research analysis data in data repositories during the review process, but since the data are not reviewed before being added to the repository, they are often added in an unorganized state. However, since data journals focus on the value of the originality of data, the data collection process, the analysis method, and the usability of data, there are clear guidelines for data standardization, data quality, and data sharing, and data sharing and management in the context of repositories are undertaken in accordance with standards and procedures for their preservation and utilization.

Recently, overseas research funders such as the National Institute of Health and NSF have established a policy that general academic papers with state-funded research results must be deposited in a public access-compliant repository desig-

nated by the National Institute of Health or NSF; and the data must be disclosed in a repository [12]. In addition, as researchers have begun to acknowledge the qualitative limitations of research that is limited to individual research fields, voluntary data sharing for facilitating interdisciplinary research has become more common. A high quantity of research data is available in general repositories such as Github, the National Center for Biotechnology Information (NCBI), and institutions' websites. However, it is difficult for researchers to use these data since they are often in the form of large sets of raw data with no detailed descriptions. Thus, researchers often encounter errors in the process of downloading and analyzing these data due to the absence of data standardization and reproducibility verification.

Data papers have data that went through basic analyses. But NCBI often receives just raw data. So, many general users feel at a loss with the data they receive from NCBI. There are even cases where general users cannot perform analyses when it is necessary to do so by themselves. (P6)

As such, there is a difference between the reliability and accuracy of data in repositories linked to data journals and data in general repositories. Therefore, descriptions of the characteristics and collection process of data in data papers increase their reusability, reliability, and utility. Data in data journals have high validity and reliability, allowing for easy utilization. In particular, since it is difficult to obtain high-quality data from experimental studies on humans or animals due to the influence of environmental and technological factors and variables, descriptions of the data collection process are important, and for special data on animals and plants collected directly in remote areas such as Antarctica, the data resource itself is very valuable.

Traditional journals focus on the value of research, whereas data journals require something new compared to existing open data. Reviewers look for original data that have not been published anywhere else. (P2)

The difficulty of routine management and preservation of research data produced in a laboratory setting also leads researchers to consider submitting data papers. This is due to the assurance that the data will be permanently preserved and available in a repository at the same time as the paper is submitted to a data journal.

Although students try to organize their data well, it is not easy to keep archiving data consistently. You have to keep the URL, but after 2 to 3 years, it is difficult. We found that the location of the data kept changing later on. It occurred to me that one of the easiest ways to maintain and share data was to submit a paper to a data journal. (P4)

For operating a repository, data structures must be managed according to the academic field, and metadata, useful and usable data, and data stability must be maintained. For data sharing and utilization, the content and quality of data should be routinely managed to prevent repositories from simply becoming data containers.

Dissemination of research achievements

You can also get credit since data papers are considered academic achievements. In practice, we believe that citations are more valuable than the credit itself in the long run. (P4)

The value of published academic achievements is confirmed by citations in other studies. The same is true for data journals; academic achievement is confirmed when a data paper is cited and the data are used in other studies.

In fact, after publishing data papers, the researchers received many data-related inquiries via email, with communications ongoing. This phenomenon can also lead to joint research in the future. Ultimately, it was found that data journals act as a channel for academic communication between researchers, going beyond the preservation of data alone to facilitate collaboration with other fields.

The data from the Genome Project are highly versatile. Analyzing the genome of a new organism, such as the human genome, does not end with my research in my laboratory. Various groups working on it use the data to experiment according to their interests. I provide my research as a sort of reference for that kind of thing. (P5)

Discussion

***Key results*:** The results of analyzing researchers' opinions on their motivations for submission to data journals and the usefulness of data are presented in Fig. 2. The most important value of data journals to researchers was to obtain credit for their research achievements using data. In particular, the main motivation for Korea-based researchers to submit to data journals was found to be to quickly publish data papers in data journals with high impact factors to be recognized as research achievements since researchers in Korea receive yearly performance evaluations based on journals' impact factors. However, since data papers describe data without an in-depth discussion, the fact that it is difficult to obtain the same degree of academic recognition with data papers as it is with research papers published in traditional journals was recognized as a limitation.

***Interpretation*:** Unlike traditional journal research papers that strictly distinguish between data and discussion/analysis, data papers obscure such distinctions. Thus, there is controversy over whether the role of data papers is to supplement or replace research papers [13]. For now, the value of data papers has been shown to be for promoting data sharing and reuse

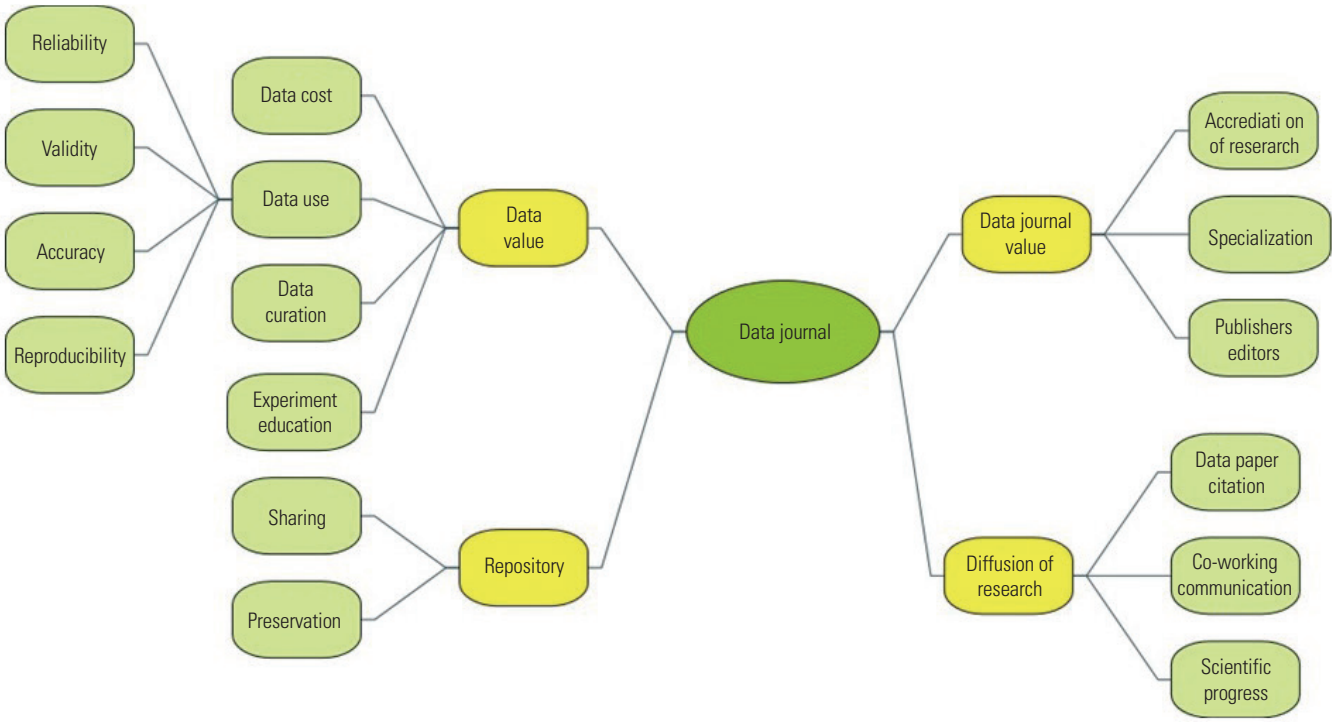

Fig. 2. Results of the cluster analysis of interview themes on submission experiences and the usefulness of data related to data journals.

rather than for obtaining academic recognition, which is complementary to existing research papers. As suggested in previous studies, the publication of data papers is useful for ensuring data quality via peer review, facilitating follow-up research and reuse based on detailed technology provided in data papers, evaluating performance through the citability of data and data papers, and providing incentives for data-sharing [5,9]. Most of the interviewees agreed that the publication of data papers was useful in these terms. In other words, all of the interviewees agreed that the reliability, validity, accuracy, and reusability of data can be secured by the publication of data papers since the data in repositories linked to data papers are verified through the peer review process. The interviewees also noted that detailed descriptions about the data in data papers allow follow-up studies and that routine management and preservation of data is possible due to the availability of quality-controlled data from data papers. In addition, the researchers believed that a major function of data papers is that they helped to disseminate research achievements according to their citability. Furthermore, the economic value invested into original data production, collection, and analysis can be shared across disciplines and used as data sets, leading to further scientific progress through interdisciplinary research (Fig. 2).

***Limitations*:** This was a qualitative study with a small number of subjects. Although the results may provide information on researchers' general perceptions of data journals, additional quantitative research is required to obtain more generalizable results. Furthermore, the subjects were limited to senior-doctoral level researchers. A wider range of researchers could provide other opinions.

***Conclusion*:** Data journals provide researchers with incentives for data-driven research. Data that have been validated through a peer review process can be used universally and preserved in a repository, and data that have been described in detail in data journals can be trusted and utilized in other studies. Data journals are expected to be used to promote subject expertise related to data, and pathways to facilitate interdisciplinary research based on data are expected to play an active role in accelerating scientific and technological advances and improving academic communication. However, we suggest that data journals should be developed as platforms for promptly providing verified, high-quality data needed by the scientific community, rather than for sharing performance-driven research achievements that are disclosed before the data are analyzed due to pressures related to research performance.

Conflict of Interest

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

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Appendix 1. Interview questionnaire

The questionnaire sought to elicit participants' opinions on motivations, needs, and barriers to publishing data papers and sharing data.

(1) What are your motivations for publishing data papers? How are the submission and peer-review processes handled, and what obstacles do you encounter during these processes?
(2) Why is it necessary to publish data papers? What are the differences between publishing data papers in data journals and traditional scholarly journals in terms of content, data quality, and the promotion of data reuse and academic development?
(3) How significant do you think data papers will be in the future? Do you intend to publish more data papers? When considering publishing data papers, what are your major concerns (e.g., recognition of research results)?
(4) What are the possibilities and limitations of founding a data journal in South Korea?
(5) Please share your views of data sharing in terms of its needs, ways to access data (e.g., repositories), its scope, research funder requirements, and the barriers you face in sharing your own data.

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Case Study

PubMed Central as a platform for the survival of open-access biomedical society journals published in Korea

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Abstract

Twenty-one years have passed since PubMed Central (PMC) launched. The present case study describes Korean editors' history of participation in PMC and their contributions to PMC. The three main turning points in the history of Korean editors' involvement with PMC were as follows: first, the production of PMC XML files and deposition starting in 2008; second, thorough evaluations of applying journals since 2014; and third, the feasibility of non-English journals being indexed in PMC starting in 2019. The importance of PMC is further shown by the fact that KoreaMed Synapse, a full-text XML database of biomedical journals in Korea that was launched in 2007, was created by benchmarking PMC. Scholarly societies or institutes publish 724 (34.2%) of the 2,119 PMC journals without embargo in June 2021. Out of those 724 journals, 127 (17.5%) are published in Korea. PMC has helped local journals receive more citations from researchers worldwide, increasing their likelihood of being indexed in international databases. The number of submissions from international researchers has increased, thereby making it possible for journals to achieve international diversity. As the best full-text platform of biomedical journals, PMC has provided an excellent opportunity for biomedical journal editors in Korea to change their journals' language to English and produce full-text JATS (Journal Article Tag Suite) XML files. These factors have made Korea the second-ranked country in terms of no-embargo PMC journals published by academic societies or institutes.

Keywords

Benchmarking; Language; Publications; PubMed Central; Republic of Korea

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Introduction

***Background/rationale*:** PubMed Central (PMC) is the full-text literature database of biomedical journals maintained by the National Center for Biotechnology Information of the US National Library of Medicine (NLM). It was established in February 2000, and 21 years have

passed since the launch of the database. At first, two journals were listed: *Proceedings of the National Academy of Sciences* and *Molecular Biology of the Cell*. The number of PMC journals has subsequently increased year by year. The turning point of the acceleration of the number of journals was the deposition of open-access journals published by BioMedCentral, PLoS (Public Library of Science), Bentham Science Publishers, Hindawi Publishing Company, Frontiers Research Foundation, MedKnow Publication Company, and MDPI (Multidisciplinary Digital Publishing Institute). On May 26, 2021, it was announced that "7,000,000 articles are archived in PMC. The content was provided by: 2,477 full participation journals, 332 NIH portfolio journals, and 7,907 selective deposit journals" [1].

It is known that citations of local medical journals—especially from Korea—increase if they are included in PMC [2]. PMC is believed to be the best platform for local biomedical journals published in Korea to increase their citations. If a journal is deposited to PMC, the abstract is transferred to PubMed, an essential biomedical database for researchers throughout the world. Before the launch of PMC, to be indexed in PubMed, it was necessary for a journal to pass the MEDLINE evaluation. However, it is challenging for local journals to pass the review by the Literature Selection Technical Review Committee. In the year 2007, a number of MEDLINE journals from Korea was 14. In May 2021 only 33 journals from Korea were listed in MEDLINE. Therefore, most biomedical journal editors in Korea tried to add their journals to PMC as part of journal development initiatives. As of June 2021, the number of PMC journals without embargo from Korea has increased to 127. It is, therefore, time to reflect on the history of the deposition of PMC XML files of biomedical journals from Korea and the contributions of Korean editors to PMC. The review of this history presented herein will provide valuable information for biomedical editors in Korea to continue to promote their journals to the international level.

***Objectives*:** This study aimed to explain how biomedical society journal editors in Korea have used PMC as a platform for the survival of their journals and to demonstrate the extent to which their journals have contributed to PMC. Specifically, the following topics were addressed: first, major turning points in the addition of Korean biomedical journals to PMC; second, KoreaMed Synapse as a benchmarking of PMC; and third, the proportion of journals from Korea in PMC.

Methods

***Ethics statement*:** This study is based on a literature database; therefore, neither institutional review board approval nor obtaining informed consent was required.

***Study design*:** The present study consists of a historical review and descriptive study of PMC journals according to country.

***Setting/Data sources/Measurement*:** Historical information was gathered from the author's experiences of PMC XML production and dissemination to other editors in Korea. The number of PMC journals and a more precise analysis according to the embargo period and country was done using the PMC journal list on June 1, 2021.

***Statistical methods*:** Descriptive statistics were applied to the analysis of PMC journals according to the embargo period, publisher type, and country.

Results

Three turning points in the addition of Korean biomedical journals to PMC

***First, production of PMC XML files and deposition*:** In 2005, I became the editor-in-chief of the *Journal of Educational Evaluation for Health Professions*. After publishing the journal for a year, I decided to change the journal's language to English-only in 2006 [3]. This decision was inevitable because the journal had only published nine articles in 2005. To maintain the publication of an appropriate number of articles, it was necessary for the journal to be able to receive manuscripts from all over the world. To disseminate the journal more widely, I also decided to add the journal to PMC. However, I had no information on PMC XML production companies at that time, and I was faced with the need to produce full-text PMC XML files by myself. In July 2006, I succeeded in producing PMC XML files for one article, which passed the validation test. The file was transformed into an HTML file through Xalan-C, an XSLT processor for transforming XML documents into HTML, text, or other XML document types. Because I served as the chair of the committee of information management of the Korean Association of Medical Journal Editors (KAMJE, https://kamje.or.kr), I began to train the staff and students taking part in internship in PMC XML production. On August 11, 2006, a PMC XML and XSLT Processor workshop was held at Sookmyung Women's University Library (Suppl. 1). This was the first step towards producing PMC XML in Korea. After the workshop, many staff and students were able to produce PMC XML files.

Many journal editors also started to change their journals' language to English-only to deposit their journals to PMC, reflecting the need to receive more citations [2]. After another workshop in July 2007 (Suppl. 2), PMC XML and Crossref XML were produced simultaneously. In August 2007, the *Journal of the Korean Ophthalmological Society* was the first society journal from Korea to achieve successful DOI and Crossref XML deposition. The *Journal of Korean Medical Sci-*

ence became the first society journal from Korea to be deposited in PMC in November 2008. PMC accepted the *Journal of Educational Evaluation for Health Professions* in February 2009. As of June 10, 2010, a total of 29 journals from Korea were deposited in PMC. Korea was the fourth-ranking country in PMC at that time (Fig. 1) [4].

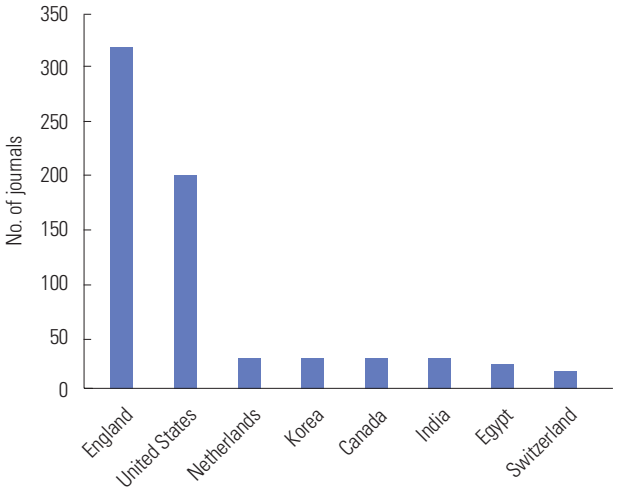

Fig. 1. The number of PubMed Central journals according to the place of publication on June 10, 2010. Reproduced from Huh S. J Korean Med Assoc 2010;53:659-67 under a Creative Commons Non-Commercial license (CC-BY-NC) [4].

***Second, through evaluation of the applying journals*:** In 2015, I started to receive emails from English-language journal editors stating that their journals' applications to PMC were being rejected. I found thorough evaluations of the scientific and editorial quality of the articles by PMC since November 2014. Scientists and medical librarians review each journal that applies to PMC. Unlike the previous initial stage of the PMC, some journals need to apply twice or three times. Nonetheless, several journals are waiting for re-application, since it usually takes 2 years to re-apply to PMC after rejection. Therefore, editors should meticulously check the scientific quality of their journals.

***Third, the feasibility of non-English journals being indexed in PMC*:** In 2019, PMC announced a new language policy as follows: "PMC will accept applications from non-English MEDLINE journals. For non-MEDLINE journals, NLM requires the primary content to be largely in English before an application can be submitted, as NLM only has the resources to review English-language content for PMC at this time" [5]. Therefore, this provides a good opportunity for editors of non-English journals to apply to PMC. The criterion of the proportion of English articles is known to be half of each issue. For example, in June 2021, six Chinese journals were deposited in PMC (Fig. 2). Many biomedical journals publish

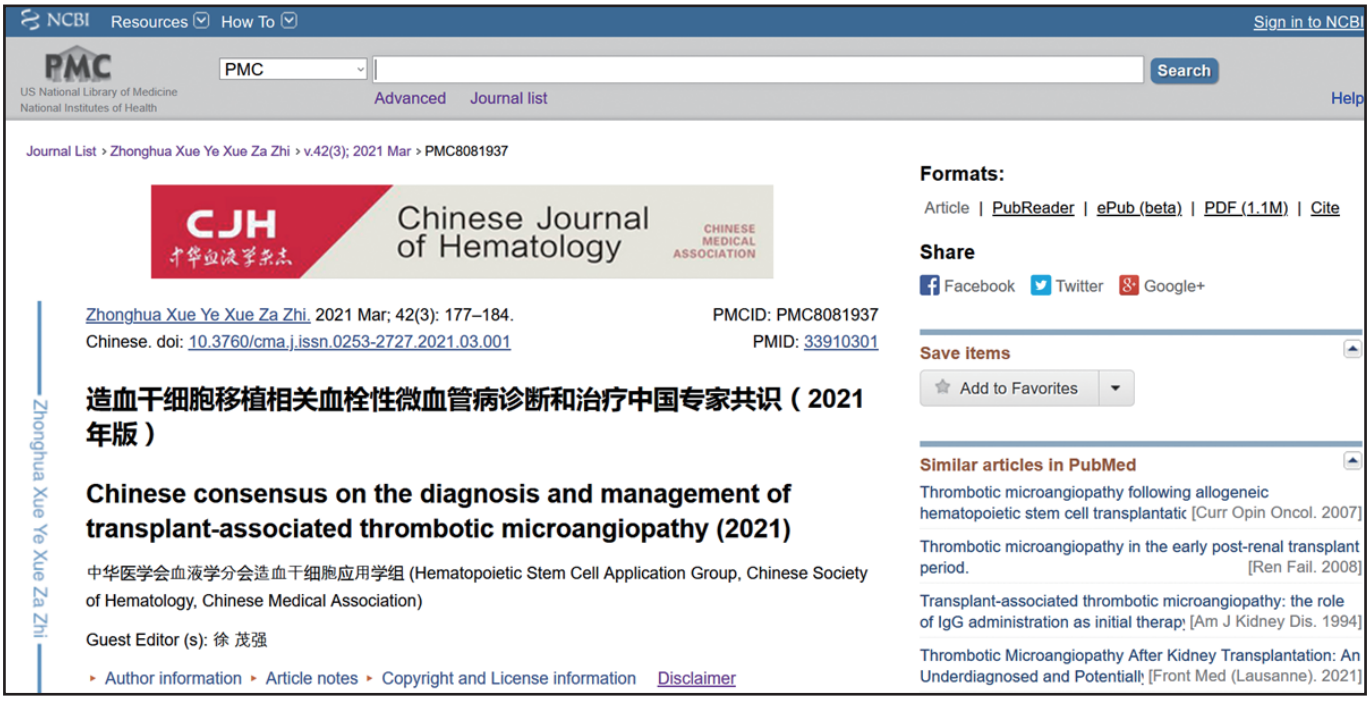

Fig. 2. *Zhonghuaxueye xuezazhi= Chinese Journal of Hematology* deposited in PubMed Central, available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8081937/ [cited June 2, 2021].

articles written in Korean or English. If half of the articles of each issue are in English, and the number of English-language articles is at least 25, the editor can apply for a journal to be deposited in PMC. The technical quality of PMC XML files from the publishing companies in Korea is excellent, and there are no worries about technical evaluation.

The above three turning points conveyed to editors in Korea the perception that the earlier the conversion to an English-only journal, the easier it is to be indexed in PMC. However, the new non-English language policy announced in 2019 provides an excellent opportunity for the editors of partially Korean-language journals to apply to PMC.

KoreaMed Synapse as benchmarking of PMC

The KAMJE constructed KoreaMed Synapse in 2007 because it was not possible to add Korean-language journals to PMC. KoreaMed Synapse is a platform imitating PMC, the content of which is made up of KAMJE journals. The difficulties faced by local journals include the lack of a platform or literature databases. The aim of KoreaMed Synapse was for articles to be accessed by world researchers through Google or Google Scholar. The early history of Synapse is described as follows: "In August 2007, the *Journal of the Korean Ophthalmological Society* launched to print DOI prefixes and suffixes on each paper. After that, 17 journals have participated in DOI/Crossref as of October 2007. KAMJE became a sponsoring publisher of DOI/Crossref for KAMJE members. Participation in DOI/Crossref requires depositing DOI XML to Crossref. Also, the landing page (or response page) should be constructed to hyperlink the full text of reference articles via the DOI system. This series of works require the new landing page database. In November 2007, the database system for landing pages and DOI hyperlinks was completed. This database adopted the PMC XML to show the full text of journals in English or bibliographic data, abstracts, figures, tables, and references of articles from journals in Korean. Therefore, if any journals in Korean move to journals in English, the presentation of full-text articles will be smoothly transferred to the PMC XML system" (https://synapse.koreamed.org/about/overview.php).

Because many databases' crawling robots crawled KoreaMed Synapse, world researchers' likelihood of accessing KoreaMed Synapse was thought to have increased. Unfortunately, in 2013, the KAMJE decided to exclude journals that did not produce PMC XML by a designated XML producing company. Thereafter, the number of journals steadily decreased until 2020. In April 2020, the new executive board decided to discontinue this monopolistic policy. Therefore, the number of journals that participate in KoreaMed Synapse will dramatically increase starting in July 2021.

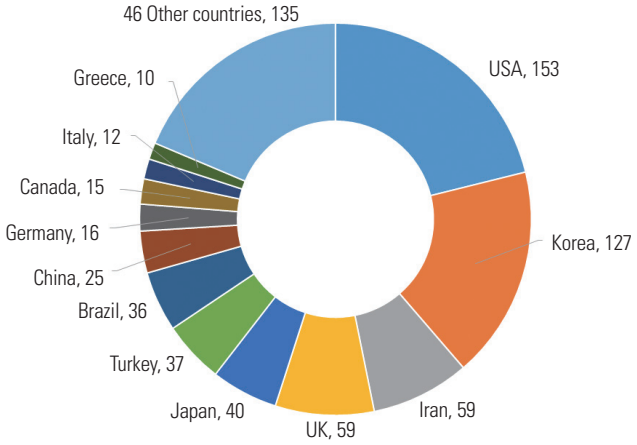

Fig. 3. Distribution of PubMed Central journals without embargo published by academic societies or non-profit organizations according to country in June 2021.

The proportion of PMC journals from Korea

Before November 2008, no journal from Korea was indexed in PMC, whereas 29 journals from Korea were deposited in PMC as of June 2010 [4]. Out of 2,199 PMC journals in the category of full participation, immediate free access, no embargo period, no predecessor, and new content, 127 journals (5.8%) are from Korea as of June 1, 2021 (Dataset 1). That number does not include some journals owned by Korean scholarly societies, but published by commercial publishing companies outside Korea. Scholarly societies or institutes publish 724 (34.2%) of the 2,119 PMC journals without embargo. If only journals published by scholarly societies or institutes are counted, the proportion of Korean journals increases to 17.5% out of 724 journals, which is the second-highest rank according to country. The number of PMC journals without embargo published by scholarly societies or institutes according to country is presented in Fig. 3.

Discussion

***Interpretation*:** The history of PMC XML file deposition and the launch of KoreaMed Synapse reflect concrete tasks deliberately undertaken by Korean medical editors to upgrade their local society journals to the international level. In particular, the initiation of PMC XML file production in 2006 was a timely step in that process. If I had not begun to produce PMC XML files in 2006, there might have been a delay in the addition of biomedical journals in Korea to PMC, and some journals might have sought out commercial publishing companies for this job.

The fact that Korea is the second highest-ranked country in PMC in terms of journals without embargo published by aca-

demic societies or institutes reflects a remarkable contribution to PMC itself, as Korean journals have substantially augmented the regional diversity of the PMC database. Many biomedical journals in Korea have applied to PMC, and a substantial number of journals have succeeded in being accepted. Starting in 2021, journals published in Korean and English have been able to apply to PMC, as long as at least half of their articles are in English. The results of applying to PMC are anticipated to be a new milestone for these journals. The history presented in this article can be a model for local society journals worldwide as a way to promote the wide dissemination of biomedical journals' content. In Korea, the involvement of commercial publishing companies in academic publishing has been rare. Therefore, the editor's role is that of an editor-publisher—not merely an editor. This means that editors must both be involved in the review and selection of the manuscripts and play an active role in processes related to publishing. They should understand and implement relevant publishing policies. This is the main difference between their role and that of editors of journals published by commercial companies, where publishing staff work to support the entire publishing process.

The value of PMC for journals in Korea can be summarized as follows. First, PMC has encouraged journal editors to change their language to English-only. Between 2011 and 2019, the number of English-only journals changed from 64 (33.5%) to 110 (57.6%) among the 191 medical journals registered with the Korean Federation of Science and Technology Societies in 2011 [6].

Second, PMC has helped local journals receive more citations from world researchers, increasing their likelihood of being indexed in international databases, including Scopus and the Web of Science Core Collection. Out of 127 PMC journals, 106 are indexed in Scopus, 54 in SCIE, and 33 in ESCI. All SCIE and ESCI journals are indexed in Scopus except for one. The *Journal of Educational Evaluation for Health Professions*, which I have edited since 2005, is also indexed in Scopus [7] and ESCI. Only 20 PMC journals are not indexed in any of these three databases, whereas 107 (84.8%) of the PMC journals in Korea are indexed in at least one international database (Fig. 4). Fifty-three journals (41.7%) are published as diamond open-access journals with no article processing charge on the author side (Dataset 1). The article processing charges of the 127 PMC journals are also listed in Dataset 1.

Third, the number of submissions from researchers from other countries increased, thereby making it possible for journals to achieve international diversity.

Currently, if a new biomedical journal launches, the first goal of the editor is to add the journal to PMC. Editors of Korean-language journals also began to recruit articles in English to apply to PMC. It is not possible to understand the development of biomedical journals in Korea without considering the role of PMC.

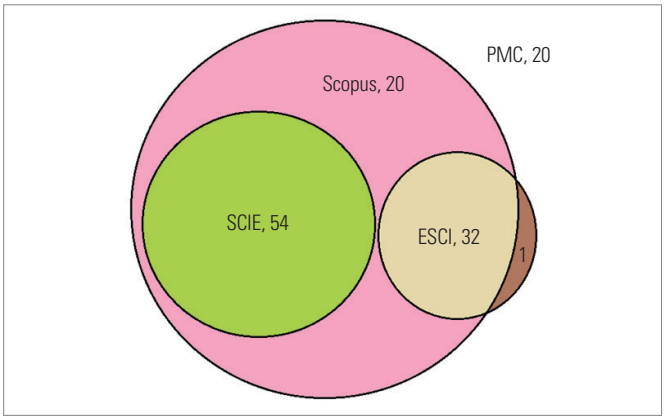

Fig. 4. The proportion of 127 PubMed Central (PMC) journals from Korea without embargo, indexed in the international databases Scopus, SCIE, and ESCI in June 2021.

***Limitation*:** The classification of publisher type and country of publication was done by the author's decision; therefore, there may have been unidentified misclassifications.

***Conclusion*:** The implementation of PMC in 2000 influenced local journal editors in Korea who wanted their journals to become top-tier international journals. It provided an excellent opportunity for them to add their journals to PubMed because PMC transferred abstracts to PubMed automatically. Crossref XML deposition in 2007 and full-text XML file deposition to PMC in 2008 were two milestones for biomedical journals in Korea, as these achievements made it possible for the journals to participate in the international scholarly network represented by Crossref and PubMed. Twenty-one years have passed since the launch of PMC, and the number of PMC journals from Korea without embargo reached 127 in June 2021, making Korea the second highest-ranked country in terms of no-embargo PMC journals published by academic societies or institutes.

Since 2019, non-English journals can apply to PMC if at least half of the articles in a single issue are written in English. This provides another excellent opportunity for journal editors in Korea. If a journal is listed in PMC, the non-English full-text articles can be deposited to PMC, and their abstracts are transferred to PubMed. It is time for biomedical editors in Korea to do their best to include their journals in PMC. As the best full-text platform of biomedical journals, PMC is anticipated to be able to sustain its top-tier brand in the future, and the US NLM is expected to continue to support this superb archiving database. Establishing a strategy and plan for

being listed in PMC is mandatory for biomedical, open-access journal editors not only in Korea, but also all over the world.

Conflict of Interest

Sun Huh has been the President of the Korean Council of Science Editors since January 17, 2020, but had no role in the decision to publish this article. Except for that, no potential conflict of interest relevant to this article was reported.

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Data Availability

Dataset file is available from: the Harvard Dataverse at: https://doi.org/10.7910/DVN/WODLKV

Dataset 1. PMC journal list downloaded from: https://www.ncbi.nlm.nih.gov/pmc/about/faq/#q8 [cited 2021 Jun 1] and analyzed data. a) PMC journal list, b) full participation journal list with only present deposition, c) full participation journal list with only present deposition and with no embargo, d) 724 society or institute journals, e) sorting of the 724 society or institute journals according to country, f) journals from Korea-only list.

Supplementary Material

Supplementary files are available from the Harvard Dataverse at: https://doi.org/10.7910/DVN/WODLKV

Suppl. 1. KoreaMed technical workshop, 2006 on PMC XML and XSLT Processor cited from https://www.kamje.or.kr

Suppl. 2. DOI/CrossRef, PMC XML workshop cited from https://www.kamje.or.kr

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Essay

Development history and publishing experiences of the *Journal of Animal Science and Biotechnology*

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Introduction

The Chinese Association of Animal Science and Veterinary Medicine (CAASVM) was established in 1936. In its 85 years, the CAASVM has become one of the largest academic organizations in China. The First National Member Congress was held in Nanjing in 1937. The CCASVM's activities soon stalled due to World War II and did not resume until 1950. The 80th anniversary of the founding of the CAASVM and the 14th National Member Congress was held in Shaoxing, Zhejiang, in November 2016. The CAASVM joined the World Conference on Animal Production (WCAP) as a national member in 1993, and Professor Defa Li was elected the vice-president of WCAP in 2008. The CAASVM hosted the 11th WCAP in Beijing in October 2013.

One of the main functions of the CAASVM is to organize scientific and technological workers in the field of animal science and veterinary medicine to carry out international and domestic academic exchange activities. The CAASVM sponsors six science and technology journals, and *Journal of Animal Science and Biotechnology* (JASB) is the first English-language journal among them.

Development History of JASB

Before 2005, although research on animal science and technology in China was fruitful, few animal husbandry researchers had published English-language papers in relevant journals indexed in the Science Citation Index (SCI) [1], and many researchers were not even aware of the benefits of publishing in English. At the time, Professor Defa Li at China Agricultural University had already begun to act on her idea to create an English-language journal in the field. However, JASB was not approved by the government until October 2009 due to difficulties related to launching a new journal, including a lack of experts and personnel, a lack of funding, and difficulties with timing. For these reasons, the first issue of JASB was finally published in June 2010, and only three issues and 23 papers were published in total that same year. In the

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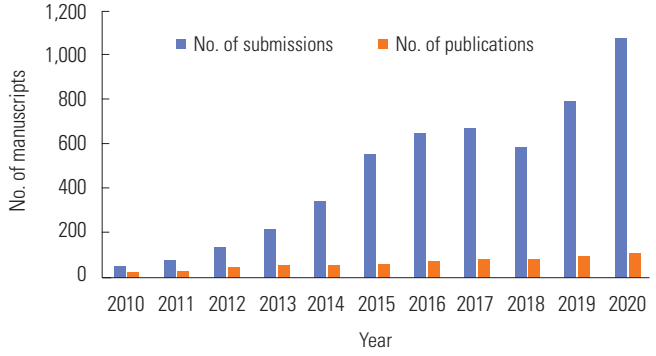

Fig. 1. The number of articles published and manuscript submissions received by the *Journal of Animal Sciences and Biotechnology* (2010–2020).

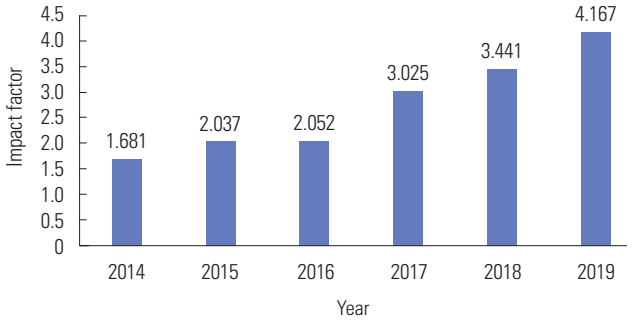

Fig. 2. Trend of the impact factor of the *Journal of Animal Science and Biotechnology* (2014–2019).

Table 1. Ranking of the *Journal of Animal Science and Biotechnology* in the field of agriculture, dairy, and animal science

	2014	2015	2016	2017	2018	2019
Rank	9/55	5/58	4/58	3/60	2/61	3/63
Quartile	Q1	Q1	Q1	Q1	Q1	Q1

first 2 years (from 2010 to 2011), a website was built for JASB and the journal's content began to be published online. Since 2012, JASB has cooperated with BioMed Central—now Springer Nature—to publish JASB on an open-access basis. All JASB articles are published online first and then later in print. The number of papers published annually has increased every year, reaching 110 newly published articles in 2020 (Fig. 1). In addition, JASB was indexed in the SCI Expanded (SCIE) in 2014, and its first reported impact factor in 2015 was 1.681. In the following years, the impact factor continued to grow steadily, reaching 4.143 by 2020 (Fig. 2). JASB's ranking in the field of agriculture, dairy, and animal science has simultaneously risen year by year as well (Table 1).

Publishing Strategies of JASB

After 10 years of development, JASB has achieved substantial success, to a degree that people in the field had not previously thought possible. The following aspects are likely the primary factors that led to the journal's success.

Determining a clear purpose for the journal and setting concrete goals

A journal is a platform for academic exchange, and a journal's development is better served when it reaches the attention of higher numbers of domestic and foreign scholars. It is also known that indexation in SCI or SCIE leads to wider recognition. Thus, the journal, from the beginning, was intended to have international reach, and the short-term goal of being indexed in SCIE within 5 years was set at the journal's inception, along with a long-term goal of becoming a well-respected journal internationally.

Achieving the internationalization of JASB

First, the editorial board was designed to consist of international scholars. The editorial board plays a tremendous role in determining a journal's quality and influence. Initially, four professors with international reputations from the United States who were famous in the fields of animal genetics and breeding, animal reproduction, animal nutrition, and feed science, respectively, were invited to serve as associate editors. The first editorial board in 2010 comprised scholars from 10 different countries around the world, and 21 countries were represented on the editorial board by 2020. Every 2 years, the journal holds an editorial board meeting that associate editors and some editorial board members are invited to attend. Second, manuscripts are solicited on an international basis. One of the hardest tasks for a new journal is to receive enough manuscripts, especially high-quality manuscripts. Although manuscript submissions were extremely scarce toward the beginning of the journal's establishment, it was determined that at least half of the manuscripts accepted by JASB would be international by inviting international authors and international editorial board members to contribute. International manuscripts accounted for approximately 51% of all manuscripts published in JASB in 2020. Third, reviewers were also sought on an international basis. Peer review ensures a journal's academic quality. JASB conducts a single-blind peer-review system, in which manuscripts are generally reviewed by two or more experts from various countries who are asked to evaluate whether the manuscript is scientifically sound and coherent, whether it duplicates already published work, and whether the manuscript is suitable for publication. After peer review, the editor-in-chief makes the final decision regarding

the publication of the revised manuscript. Finally, JASB's publishing is also international in scope. Different countries have different publishing standards and specifications. JASB adheres to international publication ethics and standards. It is also published on an open-access basis, which is in line with international publishing trends and meets the requirements of all researchers.

Improving the quality of JASB

The quality of manuscripts is the foundation of journal development. One of the important duties of our editors is to invite contributors to submit their manuscripts and publish special issues. JASB invites many famous experts in the field of animal husbandry to write review articles. The number of downloads and citations of these review papers is usually higher than those of regular submissions. Thus, they increase the influence of and bring more attention to the journal. Special issues tend to focus on trending research areas or are related to an academic conference topic (S1). For instance, JASB published two special issues titled 'Special issue for Chinese Swine Industry Symposium' and 'Special issue for WCAP 2013' after inviting the plenary speakers to contribute their research to the journal. These two special issues brought great attention and influence to JASB, which also laid the foundation for JASB to be indexed in SCIE in 2014. In addition, JASB improved the acceptance criteria for all submissions in order to more strictly control the academic level of the manuscripts accepted by the journal. The acceptance rate was about 54% when JASB was launched, whereas the acceptance rate now is approximately 12%, which ensures the academic quality of the journal. In addition, all articles are polished by a part-time editor who is a native English speaker to ensure the quality of each manuscript.

Expanding the international influence of JASB

As an academic journal, JASB can only attract more authors and readers and further enhance its quality and influence by improving its reputation and increasing its degree of recognition among researchers. Cooperating with BioMed Central to publish JASB as an open-access publication can expand the journal's influence based on the reach of international publishers. Another way to enhance the journal's influence is to visit research teams or researchers at universities and distribute leaflets about the journal to editors attending international and domestic academic conferences. In the first few years of JASB's existence, published articles were sent via email to JASB authors, reviewers, and authors for other journals to let more people know about JASB's activities. In recent years, papers published in JASB have been shared on social media platforms such as WeChat, Twitter, and LinkedIn to further expand the reach of the journal.

Conclusion

It is difficult to publish a science journal, and it is even more difficult to publish a high-quality science journal. Even though JASB has been a success over the past 11 years, it will face great challenges that will require greater efforts in the future. First, close contact must be maintained with well-known research teams in order to solicit the latest manuscripts in the field. Second, the editorial board members must remain enthusiastic about the journal, and they should be encouraged to contribute more high-quality manuscripts to improve the journal's offerings. Third, shortening the publication time could attract more authors. Fourth, communicating with authors, readers, and reviewers through various modern media channels can help to expand the influence of the journal. Finally, the most important factor for JASB's reach and influence is to attract and retain an editor-in-chief who specializes in animal science and maintains a strong interest in actively publishing papers.

Conflict of Interest

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

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Reference

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Essay

International academic publishing in Vietnam: policy efficiency and room for development

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Introduction

The purpose of this essay is two-fold. First, it evaluates the efficiency of two recent policies regarding international academic publishing in Vietnam: the new regulation on doctoral education and the establishment of the National Foundation for Science and Technology Development (NAFOSTED). Second, it outlines some possible avenues for further promotion of research in Vietnam.

Vietnam's Policies regarding International Publishing

If we had to choose the policy of the government that has had the most impact on promoting international publishing in Vietnam in recent years, we would not hesitate to "vote" for the regulation on doctoral training promulgated together with Circular No. 08/2017/QĐ-BGDĐT of the Ministry of Education and Training. Our opinion, therefore, may not align with the consensus of many others that the NAFOSTED was the most critical 'catalyst' for international publishing in Vietnam [1]. Let us view the role of NAFOSTED from a different angle. The establishment of NAFOSTED should be considered as the 'opening shot' to help Vietnamese scientists receive their first incentive from the government to publish internationally. In other words, the launching of NAFOSTED in 2008 helped encourage the Vietnamese scientific community to overcome their inertia and to publish for the first-time articles in international journals with 100% domestic authorship or with a team of authors led by domestic researchers (instead of depending or relying too much on international cooperation as before). However, the impact of Circular 08 is broader. To some extent, Circular 08 can be considered as a 'publish or perish' policy (for the first time in Vietnam). NAFOSTED only acts as one of multiple funding sources for research activity; scientists who do not want to publish internationally will still be able to find other funding sources. With Circular 08, we have for the first time a mandatory regulation whereby PhD students will not be allowed to graduate if they do not have interna-

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tional publications; similarly, university lecturers will not be able to take a supervisory role if they have not authored the required number of international publications. The 'publish or perish' nature of Circular 08 is stronger than that of NAFOSTED in this respect.

We also want to briefly discuss the 'publish or perish' culture. We completely agree with van Dalen and Henkens [2] that 'publish or perish' scientific policies have disadvantages such as encouraging quantity instead of quality. However, for countries that are still at an early stage of international integration in research, having 'publish or perish' policies like Circular 08 is critical. In our recent study [3], we divided the process of international integration of research in Vietnam into three phases: (1) 2008 and earlier: the period lacking policies to encourage international publishing; (2) 2008–2017: the beginning of international publishing in academia; and (3) 2017 to present: the period of formation and expansion.

Two crucial milestones mark these three phases: 2008 (the year NAFOSTED officially came into operation) and 2017 (the year Circular 08 was issued). Fig. 1 shows the number of international publications from Vietnam according to the three periods mentioned above, which we aggregated from the Clarivate Web of Science database [4]. This figure clearly illustrates the three phases associated with the two time points we listed above.

Room for Development

Strategies to attract talent to return

Although there are no specific data, we believe that Vietnamese researchers returning from abroad have made significant contributions to the breakthrough of Vietnam's international publications in recent years. In other words, the wave of Vietnamese students who went abroad in the 2000s has begun to produce fruitful achievements for the country. The scientists born in the 1970s and 1980s, who are now mature in terms of both health and expertise, have significantly contributed to Vietnam's achievements in international publications in recent years. Here are a few names with remarkable contributions: Prof. Pham Hoang Hiep (alumni of Sweden, Ta Quang Buu Prize, Ramanujan Prize, mathematics, born in the 1980s), Prof. Nguyen Van Hieu (alumni of the Netherlands, Ta Quang Buu Prize, physics, born in the 1970s), Prof. Phan Thanh Son Nam (alumni of the UK and USA, Ta Quang Buu Prize, Asian Scientist Award, chemistry, born in the 1970s), Dr. Nguyen Viet Cuong (alumni of the Netherlands, top 5% of global economists, born in the 1970s).

In the coming years, we will need a well-planned strategy to properly support this cohort of scientists. The current coronavirus disease 2019 (COVID-19) pandemic has severely affected academic work in Western countries [5] and narrowed the opportunities for expatriate scientists [6], which might also be the case for Vietnamese scientists working abroad. Nevertheless, on average, compared to their counterparts residing in Vietnam, the research capacity of these academic expatriates is still more advanced. Amidst the wave of overseas Vietnamese returning home [7], this is an opportunity for domestic higher education institutions and research institutions to attract highly qualified and well-trained scholars from abroad.

Fig. 1. International publications from Vietnam from 2000 to 2020. WOS, Web of Science; SCIE, Science Citation Index Expanded; SSCI, Social Sciences Citation Index; A&HCI, Arts&Humanities Citation Index. Data source: authors synthesized from Web of Science [4].

The role of research groups

For years, building strong research groups has been a strategy implemented by many higher education institutions throughout Vietnam. This strategy has helped raise domestic standards for both the quantity and quality of scientific research to meet international standards. A series of robust and potential research groups at higher education institutions throughout the country have been established over the years [8], such as the teams of Hanoi National University [9], Hanoi University of Science and Technology, Thuy Loi University [10], Phenikaa University [11], and Thanh Do University [12]. The effectiveness of the model of scientific team formation has been proven in many previous studies [13,14]. Our recent survey of educational researchers [15] also showed that the most important factor impacting researchers' international publishing practices was collaboration with domestic and international peers. In other words, establishing research groups, which foster collaborative relationships, is the most important factor for promoting international publishing—not funding or English proficiency, as most people assume.

Circular 08, on the one hand, resulted in a significant reduction in the number of enrollments at doctoral programs [16]; on the other hand, it has brought an opportunity for Vietnam universities and research institutions to innovate their doctoral programs to be higher-quality and more effective. Furthermore, it is time to recognize the importance of having quality domestic doctoral programs for providing high-quality human resources, instead of relying solely on training abroad like before. Efforts made by other countries within the region, such as Korea, China, Singapore, Thailand, and Taiwan, in innovating doctoral programs to meet international standards will undoubtedly give us valuable lessons.

According to our own observations, the above countries have these common directions in their strategies for the renovation of doctoral programs: the goal is to reach international quality accreditation standards; the method is to conduct teaching in English and attract international PhD students, grant scholarships to PhD students, and integrate PhD students with research groups in the university; the requirements are that PhD students work full-time and often have to have additional teaching experience, as well as international publications in Clarivate/Scopus journals as a prerequisite for graduation.

Interdisciplinary, multidisciplinary, and transdisciplinary research

In the international academic world, interdisciplinary, multidisciplinary, and transdisciplinary research has now become an inexorable trend [17]. Those who do not catch up will most likely be left behind. This is inevitable and understandable for the following reasons. First, complex single-disciplinary problems have either been entirely solved by earlier scientists or cannot be solved by single-disciplinary approaches. Second, the topical issues of life are themselves interdisciplinary, multidisciplinary, and transdisciplinary; therefore, it is difficult to deal with those issues through a single-disciplinary approach. For historical reasons, higher education institutions in Vietnam, except for a few exceptional cases such as two Vietnam National Universities, are mainly single-disciplinary schools, which is a significant hindrance.

In recent years, we have started to see signs of many universities aiming to develop the multidisciplinary university model [18], which can be seen as a good sign. Some other strategies to promote interdisciplinary, multidisciplinary, and transdisciplinary research are as follows: (1) prioritize funding for interdisciplinary, multidisciplinary, and transdisciplinary research; (2) prioritize research groups whose members have diverse academic backgrounds; (3) simplify the requirements when learners want to change majors/specializations (from undergraduate to master's programs, from master's to doctoral programs); and (4) open graduate training programs with interdisciplinary, multidisciplinary, and transdisciplinary orientations.

Conclusion

In recent years, Vietnam has made considerable progress in the field of international publishing, with Circular 08 playing, in our view, the most important role. The "publish or perish" nature of Circular 08 has forced Vietnamese scientists to accelerate their productivity, resulting in an increasing number of international publications. In the future, there should be more strategies to support scholars who are expatriate returnees and domestic research groups, who have contributed significantly to increasing the country's international publication output. We also recommend that the government should focus on innovation in doctoral programs and the promotion of interdisciplinary, multidisciplinary, and transdisciplinary research.

Conflict of Interest

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Essay

Policies of scholarly journal accreditation in Indonesia

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Introduction

It was known that there were 5,900 scientific journals in Indonesia in 2013. Those journals were grouped into three classes, namely non-accredited journals (5,579 titles), accredited journals (342 titles), and international journals (16 titles), and most journals are published by universities, faculties, or departments [1]. In June 2019, the number of scientific journals increased to more than 14,000. Among them, only a few journals are indexed in international databases. Up to 2019, there were 49 journals in Scopus, 63 in Web of Science master journal list, and 1, 358 in Directory of Open Access Journals (DOAJ) [2]. In July 2021, the number of journals in SCImago (https://www.scimagojr.com), which included Scopus journals, was 69; in Web of Science Master Journal List, 88; and in DOAJ, 1,867. It showed that there had been a remarkable improvement in the journal qualities. It may be possible not only by the editors' and researchers' devotion to the journals but also by the national policies of scholarly journal accreditation in Indonesia. Also, the Indonesian government has provided some support for journal publishing. It is necessary to review the scholarly journal accreditation policies to improve its system. This essay aims to explain the history of policies of scholarly journal accreditation, to clarify the current national accreditation policies, and to show trends in the journal accreditation in Indonesia

History of Policies of Scholarly Journal Accreditation in Indonesia

Since 1975, the Indonesian Institute of Sciences (LIPI) has evaluated and monitored scientific journals and other forms of publications in Indonesia. The assessment emphasizes the content and substance of publications. This framework recognized three categories of publications: scientific, semi-scientific, popular, and a mixture thereof [3]. However, the development of this straightforward assessment framework was not accompanied by success in raising the prestige of journals or establishing a tradition of high-quality publications. Therefore, in the early 1990s, the Directorate of Research Development and Community Service–Directorate General of Higher Education formed a team to examine the situation of about 300 scientific journals

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published by universities. Fundamental flaws were found in the editing of most periodicals currently available.

At the 1996 National Research and Technology Coordination Meeting held by the Office of the State Minister for Research and Technology, the need was recognized to develop an assessment instrument that could be used to accredit scientific journals nationally. Proposals were then developed with the involvement of additional experts from the Agency for Agricultural Research and Development, the Center for Agricultural Library and Research Communication (Bibliotheca Bogoriensis)–Ministry of Agriculture, Center for Scientific Documentation and Information–LIPI, and the Indonesian Editors Association. These proposed improvements were then published in the Minutes of the 1996 Research and Technology Coordination Meeting. After being evaluated based on findings in the field and corrected for deficiencies, and also with the involvement of the Ministry of Religion, the second edition of "Evaluation instruments for scientific accreditation" was published in May 2000 [4].

The policy for accreditation of scholarly journals in Indonesia was dualistic, from 2000 to 2017. In this framework, the accreditation of scholarly journals published by research and development institutions was carried out by the LIPI, whereas the accreditation of scholarly journals published by universities was carried out by the Directorate of Research and Community Service, Directorate General of Higher Education, Ministry of Education and Culture.

It was only on March 21, 2018, that a scholarly journal accreditation policy was issued based on the Regulation of the Minister of Research, Technology and Higher Education of the Republic of Indonesia Number 9 of 2018 concerning the Accreditation of Scholarly Journals. Since then, the accreditation system for scholarly journals has been conducted in a unified manner. The dynamics of scholarly journal accreditation policies in Indonesia can be briefly seen in Table 1.

Current National Accreditation Policy for Scientific Publications in Indonesia

Currently, Indonesia has a national accreditation policy for scientific journals. The purpose of this arrangement is to increase the relevance, quantity, and quality of scientific publications of Indonesian scientists to support the nation's competitiveness at the international level. Accreditation in this regulation plays the role of an assessment activity for quality assurance of scholarly journals through objective manuscript screening, appropriate management, and timely publication of scholarly journals [5].

A proposal for accreditation of a scholarly journal is handled by considering whether the scholarly journal fulfilled following conditions: 1) It contains articles that significantly advance science, technology, and/or art based on the results of research, engineering, and/or studies containing original findings and/or thoughts without plagiarism; 2) presents a qualified journal editorial board in accordance with the field of science that represents the fields of science, technology, and/or art; 3) involves qualified peer reviewers in accordance with the journal's scientific field from various universities and/or research and development agencies and different industries from within and/or abroad who screen manuscripts objectively; 4) utilizes Indonesian and/or an official language of the United Nations; 5) maintains consistency of writing style and appearance format; 6) is managed and published electronically through information and communication technology networks; 7) is published according to a schedule; and 8) has an e-ISSN (electronic international standard serial number) and a DOI (digital object identifier) [6].

Meanwhile, for the evaluation of accreditation, eight elements of the scholarly journal accreditation assessment are used, namely: the name of the scholarly journal/journal title, aims, and scope; publishing institutions/publisher; journal editing and management/editorial and journal management; article substance/quality of articles; writing style; appearance/format of PDFs and the e-journal; periodicity/regularity; and dissemination (Table 2) [3].

Furthermore, journal managers are eligible to propose accreditation of scholarly journals to the Director General of Research and Development Strengthening, at the Ministry of Research, Technology, and Higher Education. Proposals are made through the submission system for accreditation of scientific periodicals on the Arjuna website at the address http://arjuna.ristekbrin.go.id/ [7].

The results of the accreditation of scholarly journals are divided into six groups, as follows: rank 1 (score: 85–100), rank 2 (score: 70–85), rank 3 (score: 60–70), rank 4 (score: 50–60), rank 5 (score: 40–50), and rank 6 (score: 30–40). Each scholarly journal's accreditation rating is evaluated periodically (at least once every 5 years).

The Scholarly Journal Accreditation Team for evaluating scholarly journals was formed and determined by the Director-General of Research and Development Strengthening at the Ministry of Research, Technology, and Higher Education. The team members come from institutions that foster careers of lecturers, institutions that foster careers of researchers, institutions that foster careers of engineers, and career development agencies for other functional positions, comprising a total of seven people. The Scholarly Journals Accreditation Team evaluates journals based on predetermined assessment indicators (Table 2) [3].

Table 1. Dynamics of scholarly journal accreditation policies in Indonesia

	1975	2000	2005	2006	2011		2014		2018
Regulatory	Unknown	Guidelines for Submission of Proposals for Accreditation of Scholarly Journals in 2000	Regulation of the Head of the Indonesian Institute of Sciences Number 01/E/2005 concerning Guidelines for Accreditation of Scientific Magazines/Journals	Decree of the Director-General of Higher Education, Ministry of National Education Number 11/DIKTI/Kep./2006 about Scientific Accreditation Guidelines	Regulation of the Head of the Indonesian Institute of Sciences Number 04/E/2011 about Guidelines for Accreditation of Scientific Magazines/Journals	Regulation of the Director-General of Higher Education Number 49/DIKTI/Kep/2011	Regulation of the Head of the Indonesian Institute of Sciences Number 3 of 2014 about Guidelines for Accreditation of Scientific Periodicals	Regulation of the Director-General of Higher Education Number 1 of 2014 about Guidelines for Accreditation of Scientific Periodical Publishing	Regulation of the Minister of Research, Technology and Higher Education of the Republic of Indonesia Number 9 of 2018 about Accreditation of Scientific Journals
Institution responsible for scholarly journal accreditation	Indonesian Institute of Sciences	Directorate of Research Development and Community Service, Directorate General of Higher Education, Ministry of National Education and National Accreditation Board	Indonesian Institute of Sciences	Director General of Higher Education, Ministry of National Education	Indonesian Institute of Sciences	Director General of Higher Education–Ministry of Education and Culture	Indonesian Institute of Sciences	Director General of Higher Education–Ministry of Education and Culture	Ministry of Research, Technology and Higher Education
Scope of scholarly journal accreditation	Scientific magazines/journals published within the scope of R&D institutions	Scientific magazines/journals published within the scope of higher education	Scientific magazines/journals published within the scope of R&D institutions	Scientific magazines/journals published within the scope of higher education	Scientific magazines/journals published within the scope of R&D institutions	Scientific magazines/journals published within the scope of higher education	Scientific magazines/journals published within the scope of R&D institutions	Scientific magazines/journals published within the scope of higher education	Scientific magazines/journals published within the scope of R&D institutions and universities

(*Continued to the next page*)

Table 1. Continued

	1975	2000	2005	2006	2011		2014		2018
Elements of scholarly journal accreditation assessment	Content and substance of the publication	Name of periodical (5), institutional publisher (5), editor (30), stability of appearance (10), style of writing (10), substance (25), periodicity (12), and post-publishing obligations (3)	Name of periodical (5), institutional publisher (13), editor/editorial board (12), stability of appearance (9), writing style (11), substance (28), periodicity (10), circulation (5), and others (7)	Periodical name (5), publishing institution (5), editing (21), appearance (9), writing style (11), substance of content (36), periodicity (10), and post-publishing obligations (3)	Substance (36), editor and reviewer (17), writing style (15), publishing institution (9), periodicity (8), appearance (8), additional services (4), and naming (3)	Name of scientific periodicals (3), publishing institution (5), editing (18), appearance (8), writing style (13), substance of content (40), periodicity (9), and dissemination (4)	Name of scientific periodicals (3), institutional publishers (4), editing and management of publications (17), article substance (39), writing style (12), appearance (8), periodic (6), and dissemination (11)	Name of scientific periodicals (3), publishing institutions (4), editing and management of publications (17), article substance (39), writing style (12), appearance (8), periodicity (6), and dissemination (11)	Name of scholarly journals (3); publishing institution (4); journal editing and management (17); article substance (39); writing style (12); appearance (8); periodicity (6); and dissemination (11)
Scholarly journal accreditation classification	Scientific, semi-popular, and popular science, as well as a mixture of the three	Accredited fair (C) 60–69; accredited good (B) 70–79; and accredited very good (A) 80–100	Accreditation A (80–100), accreditation B (70–79), accreditation C (60–69), and not accredited (<59)	Nationally accredited scientific periodical rank A (>85), nationally accredited scientific Periodical rank B (70–85), and unaccredited scientific periodicals (<70)	Accredited scientific magazines/ journals (≥70), unaccredited scientific magazines/ journals (<70)	Nationally accredited scientific periodical rank A (>85), nationally accredited scientific Periodical rank B (70–85), and unaccredited scientific periodicals (<70)	Nationally accredited scientific periodical rank A (>85), nationally accredited scientific Periodical rank B (70–85), and unaccredited scientific periodicals (<70)	Nationally accredited scientific periodical rank A (>85), nationally accredited scientific Periodical rank B (70–85), and unaccredited scientific periodicals (<70)	Sinta 1 accreditation (85 n≤100); Sinta 2 accreditation (70 n<85); Sinta 3 accreditation (60 n<70); Sinta 4 accreditation (50 n<60); Sinta 5 accreditation (40 n<50); and Sinta 6 accreditation (30 n<40)

Table 2. Evaluation indicators for scholarly journal accreditation in Indonesia

Indicators	Quality	
	Management	Substance
Journal title, aims, and scope	3	-
Publisher	4	-
Editorial and journal management	17	-
Quality of articles	-	39
Writing style	-	12
Format of PDFs and e-journal	8	-
Regularity	6	-
Dissemination	11	-
Total	49	51

Based on [3].

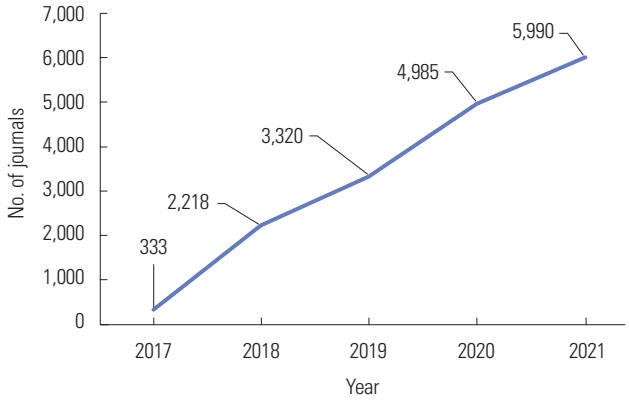

Fig. 1. Trends in the accreditation of scholarly journals in Indonesia. Based on [9].

Trends in the Accreditation of Scholarly Journals

To date, as of July 2021, there are 5,990 accredited scholarly journals in Indonesia [8]. The trend of adding accredited scholarly journals in Indonesia can be seen in Fig. 1 [9]. These accredited scholarly journals are published by 1,396 institutions in 343 cities throughout Indonesia. The accredited scholarly journals in Indonesia are dominated by the fields of education (746 journals), social sciences (283 journals), law (242 journals), business, management, and accounting (223 journals), and agricultural and biological sciences (145 jour-nals) [8].

The top three regions of Indonesia in terms of the distribution of accredited scholarly journals are East Java Province, with 1,008 accredited journals; Central Java, with 723 accredited journals; and Special Capital District of Jakarta/Daerah Khusus Ibukota Jakarta Province, with 660 accredited journals. The institution that manages the most accredited journals is Semarang State University, which manages 120 accredited journals, followed by Diponegoro University, which manages 82 accredited journals, and Ganesha Education University, which manages 81 accredited journals.. For the categorization of the ranking evaluation results, a recent report found that 97 journals had a rank of 1; 910 journals had a rank of 2; 1,165 journals had a rank of 3; 1991 journals had a rank of 4; 1,598 journals had a rank of 5; and 229 journals had a rank of 6 [10].

In Indonesia, the repository system for scientific publications is openly accessible through two platforms: the National Scientific Repository (RIN) and, as a real-time option, http://rin.lipi.go.id/. The RIN is used to store, preserve, cite, analyze, and share research data, and acts as an online medium for managing, storing and sharing research data [11] that is accessed through the "Digital Referral Guard" (GARUDA; https://garuda.ristekbrin.go.id/). GARUDA currently provides 1,404,765 articles, originating from 2,269 publishers, 12,184 journals, and 160 organizations that hold conferences [12]. Accredited scholarly journals are deposited in the national repository system and can be accessed via https://sinta.ristekbrin.go.id/journals.

Conclusion

The government of Indonesia has made efforts to develop policies for the accreditation of scholarly journals to provide quality references in Indonesia. Official accreditation of scholarly journals in Indonesia began in 1975. Up to 2017, there was a dualistic management of accreditation. It was only in 2018 that the accreditation system for scholarly journals was integrated into the Ministry of Research, Technology and Higher Education. The government of Indonesia additionally provides a repository system, which is openly accessible through http://rin.lipi.go.id, https://garuda.ristekbrin.go.id/, and https://sinta.ristekbrin.go.id/journals. For the evaluation of accreditation, eight elements are used. The results of the accreditation classified scholarly journals into six groups according to the evaluation score. The number of accredited journals has increased year by year, and it reached 5,990 in July 2021 from 333 in 2017. There may be a continuous increase in the number of accredited journals in the future. The above accreditation system is believed to increase the article quality and style and format of scholarly journals in Indonesia.

Conflict of Interest

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

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Meeting Report

The 2021 Korean National Open Access Policy Forum

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National Research Foundation of Korea, Daejeon, Korea

Brief meeting information
Date and delivery method: June 17, 2021 2 p.m. to 5 p.m., live broadcast on Naver TV, Kakao TV, and YouTube.
Venue: GLAD Yeouido Hotel, Seoul, Korea.
Organized by: Offices of Members of the National Assembly of the Republic of Korea including Wonwook Lee, Dukgoo Kang, and Yeungshik Kim.
Hosted by: National Research Foundation of Korea, Korea Federation of Science and Technology Societies, and Korea Institute of Science and Technology Information.
Sponsored by: Ministry of Education and Ministry of Science and Technology Information and Communication.
Purpose: The purpose of the 2021 National Open Access Policy of Korea was to design comprehensive measures for the direction of a national open access (OA) policy in South Korea, with goals such as providing free access to government-funded research results, encouraging OA publication in domestic academic journals, and mitigating expensive international journal subscription fees.

Introduction

The 2021 Korean National Open Access Policy Forum was held on June 17, 2021, in Seoul, Korea (Fig. 1). This paper aimed to summarize the proceedings to advance the discussion of OA policies among scholarly journal editors and researchers in Korea. The content of this paper may be helpful for editors who manage journals and for researchers selecting journals for future submissions. In this paper, the presentations by the three speakers are described, followed by a summary of the discussion between the six panelists and comments by the chair of the panel discussion. Finally, potential future directions regarding OA policy in Korea are suggested.

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Presentation Topics of the Three Speakers

Challenges and tasks for OA (Jeong-Wook Seo, Director of Clinical Research Center, Incheon Sejong Hospital, Incheon and Professor Emeritus, Seoul National University)

The OA movement commenced in earnest in the late 1990s and the early 2000s. Researchers

Fig. 1. Photo of six panelists and the chair at the 2021 Korean National Open Access Policy Forum, held on June 17, 2021, in Seoul, Korea.

tend to prefer OA since it ensures that their papers will be read and cited more; however, publishers prefer there to be an article processing charge (APC). As a result, researchers are often required to pay a fee to publishers when publishing OA articles to ensure profitability.

When Seoul National University (SNU) professors first began to publish OA articles, the university supported APCs, and the APCs borne by the university gradually increased. Later, SNU imposed an upper limit of APCs per professor. SNU and its professors paid an estimated 3.4 billion Korean won to publishers in 2015. In addition, the costs associated with subscribing to international journals at SNU libraries increased tenfold from 860 million Korean won in 2002 to 8.96 billion Korean won in 2015. Subscription fees for university libraries in Korea have been growing by 3% to 4% every year. Although the cost increase related to APCs was higher, journal subscription costs also increased.

This phenomenon is not just a Korean issue, but also a global one. These issues led to the implementation of Plan S in Europe. The "S" in "Plan S" stands for "shock," and the policy was in turn designed to mitigate the problem by giving it a "shock," mandating that all papers funded using public research funds from all countries in the European Union must be published as OA articles beginning in January 2021. Foreign libraries struggle with the same issues as Korean libraries. Since this is a global issue, it is necessary to collaborate with stakeholders regarding the legal and institutional mechanisms that can be used to implement OA policies and lay the groundwork for OA policy in the future.

Subscription journal issues and the transition to OA (Hwan-Min Kim, Secretary-General of Korean E-resource Service for Library, Korea Institute of Science and Technology Information)

Upon analyzing the publication volume of Science Citation Index Expanded papers by publisher, it was found that 78% of Science Citation Index Expanded papers by Korean authors were published by the top 20 publishers. In Korea, subscription-based publishers that do not specialize in OA are subject to major OA conversion contracts. The top 30 institutions in Korea produce about 70% of articles in subscription-based journals, and if a journal actively publishes OA papers, there will be quicker results. OA conversion contracts mainly comprise read-and-publish (RAP) agreements. Read-and-publish refers to an agreement that bundles access and publication costs together. Alternatively, publish-and-read agreements pay only for publishing and include access rights at no additional charge. Examining OA conversion contracts by publisher, Elsevier was found to have signed a publish-and-read contract with the University of California in March 2021 [1]. A contract between Wiley and Germany allowed OA publications for a fee of 2,750 euro per article [2]. After comparing the costs to publish OA articles in Wiley journals between Korea and Germany, Korea was found to pay a fee of 4,742 US dollars for the production of one article, while researchers from Germany can publish an OA article for a fee of 3,300 US dollars (2,750 euro) per article. When comparing the cost of publishing in Elsevier between Korea and the University of California, the estimated fee for producing one OA paper in Elsevier from Korea was 3,188 US dollars, while it was only

2,448 US dollars for the University of California. It was estimated that Korea currently spends approximately 180 billion Korean won annually on subscription fees and about 50 billion Korean won on APCs, adding up to an annual total of 230 billion Korean won.

Measures to support OA in domestic academic journals (Sook-Ja Park, President of the Society of Popular Narratives and Professor at Sogang University)

In a recent study, 32 leaders from humanities and social science journals participated in focus group interviews from December 2020 to June 2021 about journal support. Among the 32 respondents, 87% answered that "strengthening publicity (OA publishing)" is essential for journal support. However, respondents were also worried about OA conversion since it would result in no immediate income, such as copyright fees. In addition, they were concerned about whether public databases would become influential enough to replace commercial databases. Respondents still wanted the support of professional publishing companies, including services such as manuscript editing. The National Research Foundation of Korea supports only about 10% of the total 1,800 journals in the humanities and social sciences. Therefore, in order to strengthen the public reach of academic papers, the National Research Foundation of Korea has asked for financial support from the government to assist with OA conversion.

Discussion by Six Panelists

Myung-Hwan Kim (General Director, SNU Library and Professor at SNU)

The number of Korea Citation Index-registered journals in the humanities and social sciences is about 1,800. Therefore, it is estimated that OA conversion can be attempted with an annual budget of 20 billion Korean won. In addition, it will be possible to quickly switch to OA using the National Research Foundation of Korea's journal evaluation system.

Young-sil Koo (Director of Academic Research Affairs Division, Ministry of Education, Republic of Korea)

The Ministry of Education has supported removing barriers for accessing e-journals. Beginning in 2021, researchers at non-subscribing universities are now able to access e-journals at no cost. More budgets for similar initiatives are needed in the future.

Hang-bok Wee (President of the Korean Federation of Humanities and Social Sciences and emeritus professor at Hanyang University)

Many language barriers can be resolved using artificial intelligence. The corpus of academic papers in non-indigenous languages has significantly grown. In addition, institutions should refrain from giving professors more credit for publishing articles in international journals during the performance evaluation process.

Chongmin Yoon (Professor at Graduate School of Law, Chungbuk National University)

The question arises of how we can provide a legal basis for OA policy. A legal foundation for promoting OA based on related policies, including the Framework Act on Science and Technology [3] or the Science Promotion Act [4], must be established. In the National R&D Innovation Act [5], regulations on how to specifically support diffusion in the disclosure, registration, and utilization of various research results, such as research reports and papers, should supplement a new policy. However, in order to make OA mandatory, it is necessary to distinguish between policy promotion and strengthening stakeholders' copyright. Implementation of policies such as financial support or budget support can be resolved by strengthening the relevant laws. Still, such policies could limit the rights of academic researchers. For example, mandatory OA may interfere with the rights of individual researchers concerning commercial publishers. Due to potential conflict-of-interest issues related to mandatory OA policies, a cautious approach is required.

Seok-rae Lee (Officer of the Performance Evaluation Policy Bureau, Ministry of Science and ICT, Republic of Korea)

With enough financial support supplementing the publication costs of domestic academic journals, it will be possible to convert them to OA journals quickly. The Ministry of Science and ICT (Information and Communications Technology) currently provides scientific journals with approximately 2.1 billion Korean won annually, but it will gradually increase the amount to about 10 billion Korean won through the Korean Federation of Science and Technology Societies. Adding mandatory OA policies should be considered in the imminent future in light of the Framework Act on Science and Technology.

Sun Huh (Professor at College of Medicine, Hallym University)

To optimize the quality of academic OA journal promotion, 0.1% of the total R&D budget of the Korean government should be designated for journal publishing support. As of 2021, 6.7 billion Korean won—about 0.025% of the total national R&D budget—goes toward supporting academic journals. With an increase to 0.1% of the national R&D budget,

there would be a budget of approximately 27 billion Korean won. Researchers generally do not object to mandatory OA publication of government-funded research results, but one premise is crucial—namely, it is less burdensome to researchersif APCs can be paid using any research funds Usually, articles are published after the research is completed.

Comment by the Chair of the Panel Discussion

Kang-jae Lee, (Director of Humanities and Social Sciences Division, National Research Foundation of Korea, Professor of Chinese Language and Literature at SNU)

Although there are clear differences between the humanities and social science fields and science fields in a variety of aspects, everyone tends to agree that OA should be actively promoted. It is important to note that this forum was held openly in the interests of the National Assembly and the government. With the interest and active support of the Ministry of Education and Ministry of Science and ICT, the process of implementing new mandatory OA policies must be pursued.

Conclusion

This meeting was organized by three members of the National Assembly of the Republic of Korea. This indicates that representatives of the Korean people have a significant interest in OA policy. In the United States, a public access policy was introduced by the United States National Institute of Health and the National Science Foundation [6]. In Europe, Plan S has been in place since January 2021, which requires mandatory OA publication for research results supported by specific funding organizations [7]. In Korea, the debate on OA policy has continued since the early 2000s. However, there was not always concrete legal support for an OA policy. The implementation of an OA policy pertaining to research articles supported by the Korean government should be differentiated from policies related to subscription journals published by commercial publishing companies. The most urgent immediate step is to establish a legal basis for the mandatory deposition of government-funded articles in public repositories or journal homepages immediately after publication. The second step is to discuss how to support author-side APCs related to OA publication. The third step is to help domestic society journals adopt OA policies when societies are unable to allocate sufficient budgetary resources for journals that do not have subscription fees. As for support for society journals, government officials have stated that more funding would be provided soon. Dr. Huh's proposal to dedicate 0.1% of the government's annual R&D budget to journal publishing may be the best incentive for journal editors. APCs may be a financial burden to researchers who wish to publish in top-tier international journals. The solution is either to allow a 1-year embargo period, as in the public access policy implemented in the United States, or to pay authors' APCs using research funds. Another way is to encourage researchers' institutions or other public funding agencies to assist with APCs, although such organizations cannot be forced to do so.

Since Korea is one of the top countries in the performance of science research, the adoption of an OA policy by the Korean government will be another milestone in the research literature market. I anticipate that this meeting will trigger the implementation of an OA policy in Korea.

Conflict of Interest

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Meeting Report

2021 Council of Science Editors annual meeting

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From May 3 to 5, the 2021 Council of Science Editors annual meeting was held online. The main sessions were held daily for three days from midnight to 6:15 a.m. Korea time. On each day, two roundtable discussion sessions were held in parallel for one hour, followed by a 30-minute training session. Next, a keynote session was held for one hour, and four presentation sessions were conducted simultaneously for one hour, which was repeated once after a short break. In total, six discussion sessions, three training sessions, three keynote sessions, and 24 presentation sessions were held for three days. As one can guess from the large number of sessions, presentations on a wide variety of topics were made and the overall process went smoothly. Since the sessions were held after midnight Korea time, it was difficult for me to attend all of them, so I selected and participated in a few sessions on topics of particular interest to me. It was very helpful that registrants were allowed to watch the recordings of many sessions and also to download many of the presentation materials. It was especially useful because one could see all the recorded videos and presentations of the sessions that one couldn't attend because they were running in parallel. In addition, many of the recorded videos simultaneously showed scripts of what the presenters said, which were obtained using a speech recognition software.

The keynote speaker on the first day was Jessica Malaty Rivera, Science Communication Lead of the COVID Tracking Project, an organization that collects and communicates various data related to coronavirus disease 2019 (COVID-19) in the United States. The topic was about how to effectively communicate science with the public. She presented her views on scientific communication in general, which were not limited to COVID-19. I felt that some of her methods of presenting data effectively were very similar to those used when writing scientific papers. It was interesting to hear that the person in charge of scientific communication should know not only the languages of scientists and non-scientists, but also that of pseudo-scientists, and should also be familiar with the emotional and cultural language.

Among the presentation sessions on the first day, the session entitled "Managing information from preprints" was particularly interesting. Preprints have been frequently discussed in this meeting, which is thought to be related to the fact that the role of preprints has been greatly expanded as a large number of research papers on COVID-19 have been prepublished as preprints during the pandemic. The first speaker was John Inglis, co-founder of bioRxiv and medRxiv, which are representative preprint sites in the field of biology and medicine, and pre-

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sented various numerical data related to the usage of those sites during the pandemic. He also explained the screening process of papers in those sites and it was impressive that they underwent more rigorous screening by far more personnel than arXiv, a preprint site in the field of physics. The second speaker was Bruce Rosenblum of Inera, a journal editing software company, who presented issues related to citation and metadata of preprints. He gave examples of the problems that could occur in relation to this topic, such as those occurring when the sites that post preprints do not state clearly that the posted papers are preprints, when the same paper is posted on multiple preprint sites, and when the relationship between the original preprint and the revised preprint is not clearly stated. I thought this was an important issue and deserved further consideration. The third speaker was Iratxe Puebla of ASAPBio, an organization that supports the expansion of preprints in the field of life science, and presented ways to provide high quality metadata for preprints and to expand the screening of preprints to increase their reliability. On the first day, there were presentations on many other topics, including XML fundamentals, open access, and the diversity of editorial boards.

Among the presentation sessions on the second day, the "Artificial intelligence-assisted editorial tools" session was interesting to me. The application of artificial intelligence technology such as machine learning, data mining, and natural language processing to the editing and publishing of academic journals has recently attracted much attention as a rapidly developing area. In the first presentation, Robyn Mudgridge and Hannah Hutt of Frontiers, a journal publisher, introduced AIRA, an artificial intelligence-based editing software developed by Frontiers. This software automatically examines the quality of submitted manuscripts and whether there is a violation of research ethics in various aspects and performs the function of finding appropriate reviewers and editors. With the use of AIRA, the speaker said that that the quality of reviews and the satisfaction of authors were significantly improved. In the second presentation, Jennifer Chapman of the American Society of Civil Engineers introduced the experience of using artificial intelligence software called UNSILO Evaluate in four journals published by the American Society of Civil Engineers through concrete examples. Its main function is to automatically examine the quality of sentences, the accuracy of references, self-citations, and the accuracy of tables and figures for submitted papers, and to assist editors in their judgment. In the third presentation, Daniel Evanko of the American Association for Cancer Research introduced SciScore, an artificial intelligence-based software developed by the American Association for Cancer Research. The main purpose of this software is to enhance the reproducibility of the results of published papers. Authors are given scores by applying SciScore to the method section of their paper when submitting it. This score is awarded by automatically examining the rigor and consistency of various items related to research methods and data sources in the medical field. If the score is less than 4 out of 10, the authors will be asked to revise the method section. The speaker said that the overall quality of published papers improved through this process.

Another session of particular interest on the second day was "Research misconduct corrections/retractions: how to avoid getting sued" presented by Debra Parrish, an attorney at Parrish Law Offices. She gave a presentation of judicial precedents on various kinds of civil lawsuits that might arise in relation to the papers that were judged to be in violation of research ethics and retracted from publication. In particular, examples of various situations in which journal publishers could be sued, such as copyright infringement, plagiarism, research fraud, and defamation, and ways to avoid such lawsuits as much as possible were presented. On the second day, additional sessions were held on topics such as the policy regarding author list modification, fast track publishing processes, and overlay journals.

The keynote session on the third day was titled "Ethics whistleblowers and the responsibilities of journal editors." Two speakers gave presentations on how editors should deal with serious research ethics violations, such as fabrication of data or figures in published papers, and then conducted discussions with each other. Elisabeth Bik advocated expeditious action in an open manner when clear violations were discovered. On the other hand, Daniel Bolnick of the University of Connecticut pointed out the negative side effects that can occur when processing in an open manner and suggested that a more cautious approach was better for academics and journals. I felt that the validation and evaluation of academic papers should be done in a cautious manner and Bolnick's arguments made more sense.

Among the sessions on the third day, "The ethics of data sharing" was particularly interesting. The first presentation was made by Trevor Lane, a council member of the Committee on Publication Ethics. He gave a summary of the basic principles proposed by the Committee on Publication Ethics in relation to responsible data sharing. The second speaker was Shelly Stall of the American Geophysical Union, who discussed the problems that could arise with the papers written using publicly available data through real examples. The third speaker was Matt Cannon of Taylor & Francis, who gave a presentation on the proper way to deal with many cases related to data sharing, including the use of data containing personal information. I felt that the issues presented in this session needed to be continuously discussed, since various situa-

tions could arise in which several principles could be in conflict with each other. On the third day, other sessions were held on topics such as author-friendly submission methods and journal management.

I consider the 2021 Council of Science Editors annual meeting to be a very useful meeting where numerous presentations on various timely topics were made efficiently. It was impressive that many of the sessions were designed for professional editors working in journal publishing houses. Even in the midst of a pandemic, I could learn that the publication of academic journals was being carried out healthily and further development in new directions was taking place.

Conflict of Interest

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Training Material

Participation Reports help Crossref members drive research further

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Abstract

This article aims to explain the key metadata elements listed in Participation Reports, why it's important to check them regularly, and how Crossref members can improve their scores. Crossref members register a lot of metadata in Crossref. That metadata is machine-readable, standardized, and then shared across discovery services and author tools. This is important because richer metadata makes content more discoverable and useful to the scholarly community. It's not always easy to know what metadata Crossref members register in Crossref. This is why Crossref created an easy-to-use tool called Participation Reports to show editors, and researchers the key metadata elements Crossref members register to make their content more useful. The key metadata elements include references and whether they are set to open, ORCID iDs, funding information, Crossmark metadata, licenses, full-text URLs for text-mining, and Similarity Check indexing, as well as abstracts. ROR IDs (Research Organization Registry Identifiers), that identify institutions will be added in the future. This data was always available through the Crossref's REST API (Representational State Transfer Application Programming Interface) but is now visualized in Participation Reports. To improve scores, editors should encourage authors to submit ORCIDs in their manuscripts and publishers should register as much metadata as possible to help drive research further.

Keywords

Crossref; Metadata; Participation Reports; Research infrastructure; Scholarly communications

Introduction

***Background*:** Metadata is heavily relied upon by both researchers and the scholarly community as it helps drive new discoveries. This became especially important during the coronavirus disease 2019 (COVID-19) pandemic. Sharing metadata openly helped researchers make important connections, build upon previous research, and perhaps played a part in the work to create the COVID-19 vaccine. As a scholarly infrastructure provider, Crossref played a role through collecting the metadata from its members (who include publishers and funders), storing it, and then distributing it in an open, standardized and machine-readable format to discovery services and other tools that researchers use worldwide. This is important because open scholarly in-

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frastructure has become critical to many in the research community, especially in light of some more commercially-run infrastructure being discontinued. In June of 2020 and again in January of 2021, Crossref released over 100 million metadata records as a large public data file to help spur the efforts of researchers. The combined power of all of our members' metadata enabled the community to use it in creative ways and build tools that help drive important discoveries.

Crossref collects a lot of metadata from its members but it is not always easy to see what metadata is in Crossref. Authors and editors want to see what metadata their production teams or vendors register with Crossref because richer metadata can help increase the discovery of their journals and publications. However, without querying Crossref's Representational State Transfer Application Programming Interface (REST API) it was really hard for them to get at this information in the past. So Crossref created an easy-to-use tool called Participation Reports, which helps publishers, editors, authors, and researchers see the most important or key metadata elements Crossref members are registering.

***Objectives*:** This article aims to explain each key metadata element, why it's important to check the reports regularly, and how Crossref members can improve their scores. Specifically presented as follows: definition of participation reports, its importance in research, ten key elements of the reports, editor's role to improve the coverage in participation reports, and future plans.

What Are Participation Reports?

Participation Reports provide an easy way to see coverage of ten key metadata elements above and beyond the basic bibliographic metadata that all members are obliged to provide [1]. This includes metadata such as ORCID iDs for contributors, funding acknowledgements, reference lists, and abstracts—richer metadata that makes content more discoverable, and much more useful to the scholarly community as a whole, including among members themselves [2]. It's a visualization of the metadata that's already available via our public (REST API), except it's much easier to use. It is a place where anyone can see the metadata coverage of members, and members themselves can track their progress over time to see what's already registered and what's still missing. They are free and open to everyone and don't require a login. Participation Reports from the Korean Council of Science Editors was presented in Fig. 1.

Why Are Participation Reports Important?

Metadata helps move research forward and helps make new discoveries happen. Crossref members that register a lot of metadata, especially richer metadata, help make content useful to researchers and the scholarly community. Members are not always aware however if they're registering the key metadata elements that help make those important connections and drive research further. Some rely on vendors or third parties to send their metadata deposits to Crossref and that makes it even harder to know exactly what metadata they are registering. Participation Reports show members and editors exactly what key metadata is being registered for their journals or publications, why it's important, what's still missing, and how to fill in the gaps.

What Metadata Does Crossref Collect?

Crossref collects a lot of metadata but not all of it is displayed in the Participation Reports. We have different types of metadata that our members register with us and that metadata serves many different purposes. We require basic bibliographic metadata to register a DOI, but it's the richer metadata that makes content go even further - for example, being able to find articles via an ORCID iD, who funded the research or the license it is published under all helps too.

Explaining Administrative, Descriptive, and Structural Metadata

Administrative metadata provides information about the origin and maintenance of a research object. This includes a link to accessing its full-text. Administrative metadata includes information needed to support the preservation of a research object, including archiving arrangements.

Descriptive (bibliographic) metadata consists of metadata used to describe and cite an item. Examples of bibliographic metadata include authors, titles, pages, dates. The bibliographic metadata registered with Crossref is used mainly in matching DOIs to citations and capturing citations in reference management tools.

The third type of metadata is structural metadata, which provides information about how research objects are organized, both within a research object (for example, a book composed of chapters, chapters composed of pages, and pages arranged in a particular order), and relationships between research objects (for example, a preprint, version of record, and a dataset).

What Metadata is Displayed in the Participation Reports?

All of the administrative, descriptive, and structural metadata

Fig. 1. Participation Reports example from the Korean Council of Science Editors.

is available via our REST API but in Participation Reports Crossref chose to display 10 key metadata elements that would make the greatest impact on members' content making it useful to researchers and the entire scholarly community. These key elements add context and richness, and help to open up content to easier discovery and wider and more varied use. The 10 key elements Crossref chose to display In Participation Reports are: References, Open references, ORCID iDs, Funder Registry IDs, Funding award numbers, Crossmark-enabled, Text-mining URLs, License URLs, Similarity Check URLs, and Abstracts [3]. More detail on each is provided in the next section.

Why Are the 10 Key Elements in Participation Reports Important?

References

References are a big part of the story of a piece of content, highlighting its provenance and where it sits in the scholarly map. References give researchers and other users of Crossref metadata a vital data point through which to find content, which in turn increases the chances of it being read and used. They also enable members to use Crossref's Cited-by service, which means they can query for publications that cite a work, as well as showing citation counts and lists for articles (Fig. 2).

Open References

Open References displays the percentage of registered references that are set to be openly available. If a member has set their references to 'open' (and they are encouraged to do so), they're available to all users of all Crossref APIs and services. If not, fewer people can see and use them. Most members' citations are set to open but Participation Reports help easily check this and if the percentage is 0% then they are not set to open. Members registering references can make their references open by emailing Crossref's support team, and there is no charge to do so.

ORCID iDs

These persistent identifiers enable users to precisely identify a researcher's work—even when that researcher shares a name with someone else, or if they change their name. Governments, funding agencies, and institutions are increasingly seeking to account for their research investments. They need to know precisely what research outputs are being produced by the researchers that they fund or employ. ORCID iDs allow this reporting to be done automatically and accurately which is why Crossref encourages this. Adding ORCID iDs to Crossref metadata also enables ORCID auto-update, meaning that a researcher can be notified when a work connected with their ORCID iD is published, and they can choose to automatically add that work and any future works to their ORCID profile, saving them time.

Funder Registry IDs

Funder Registry IDs identify organizations that funded the research. Publishers extracting these funding acknowledgements from content or collecting them via submission systems and adding them to Crossref metadata allows funding organizations to better track the published results of their grants, and allows publishers to analyze the sources of funding for their authors and ensure compliance with funder mandates.

Funding award or grant numbers

These are numbers assigned by the funding organization to identify the specific piece of funding (the award or grant). If funding award numbers are included then funding organizations are able to better track the published results of their grants and research institutions are able to track the published outputs of their employees.

Crossmark-enabled

The Crossmark service gives quick and easy access to the current status of a content item. With one click, a reader can see if the content has been updated, corrected, or retracted and

Fig. 2. Screenshot to show the percentage of content items that include reference lists in their metadata.

can access extra metadata provided by the publisher. It allows publishers to reassure readers that the publication keeps content up-to-date, and showcases any additional metadata the journal wants readers to view while reading the content (for example license and funding information or information on the peer review process).

Text-mining URLs

Researchers are increasingly interested in carrying out text and data mining of scholarly content, which is the automatic analysis and extraction of information from large numbers of documents. Text-mining URLs are links to the full text in the metadata (rather than just the landing page) to help researchers easily locate content for this purpose. Including full text URLs makes it easier for researchers to mine content, which increases discoverability and potential uses of the research.

License URLs

Members can include a link to their use and reuse conditions: whether this is their own proprietary license, or an open license such as Creative Commons. Including license URLs (or access indicators) in metadata is very helpful in letting readers know how they can access and use the content.

Similarity Check URLs

The Similarity Check service helps editors to prevent scholarly and professional plagiarism by providing editorial teams with access to Turnitin's powerful text comparison tool, and a comprehensive database of scholarly and other content to check documents against. Similarity Check URLs are full text URLs that enable iThenticate to index members' content into this database. Including Similarity Check URLs gives Crossref members access to the Similarity Check service, and also ensures that their content is included in these checks.

Abstracts

Including abstracts in the publication metadata gives more information to the user about a piece of content, making it more discoverable. Readers are more likely to navigate to an article if they can read an abstract because it gives further insight into the content of the work. Last year the I4OA (Initiative for Open Abstracts) was launched which encourages publishers to share their abstracts as part of their metadata in Crossref [4].

How to Use Participation Reports?

The reports are easy to use. Anyone can simply start by navigating to https://www.crossref.org/members/prep/ then type in the member name into the search box and that will take them to the report for that member [5]. The report dashboard page shows a variety of information including the total registered DOIs, content types, current or backfile content, and most importantly the 10 key metadata elements that are explained above. Next to the elements there are percentages that indicate what percentage of the DOIs include the particular metadata element. It's possible to filter by content such as journal articles, book chapters, datasets, and preprints, depending on what content types the member has registered. It's also possible to compare current content (past two calendar years and year-to-date) to back file content (older than that). And within the journal articles view, it's possible to drill down to view the metadata completeness for each individual journal. Crossref hears that editorial boards are keen to see that aspect!

Participation reports are free and open to everyone and don't require a login. Crossref recently agreed to adopt the POSI (Principles of Open Scholarly Infrastructure) [6], which offer a set of guidelines by which open scholarly infrastructure organizations like Crossref can be run and sustained [7]. And sharing metadata openly and investing in open infrastructure is one of the most important commitments that Crossref is trying to stand by.

How to Improve Coverage in Participation Reports?

Members should check their Participation Report and share it with their production teams or vendors to see what exactly is currently being registered with Crossref and what can still be added. Editors can encourage researchers to get and submit ORCIDs as part of the manuscript submission process. Funding data can be added from the acknowledgements sections. Organizations planning to join Crossref in future should make a plan to send as much metadata as possible to Crossref, focusing on the key elements listed in the reports.

Future Plans

Based on feedback from the community, Participation reports will see some updates in 2021. Some of these updates include (1) the member search bar will be incorporated on the dashboard page so that users will no longer need to go back to the Participation Reports homepage to find another member; (2) Crossref will make a few improvements to the member information displayed and will make the total registered content items display more accurately; (3) alternative or additional member names will be displayed; (4) refining how date ranges are changed (current content, backfile content, and all time); (5) simplifying filtering by content-type; and (6) Open References will be combined with References as a single key ele-

ment indicating percentage of open references all in one. Some members had found the current display confusing.

Crossref is also planning on adding additional key elements as they start to be collected via the metadata and become available in the REST API. ROR IDs (Research Organization Registry Identifiers) will hopefully be added next [8]. This persistent identifier connects research organizations to their outputs and makes it possible to see which researcher is working with which organization. In the future Crossref is also hoping to also add Grant identifiers which funders can now register with associated metadata. This will make it easier to include information about the use of facilities, equipment, salary awards and so on, and to show transparency into research funding and its outcomes.

Conclusion

The provision of rich metadata creates value for the research community. However, it's not always easy to see what important metadata Crossref members are registering for their publications. Crossref's Participation Reports provide an easy way to see who is registering what key metadata elements in Crossref. They can help members, authors, and editors figure out what important metadata elements are already registered and what's still missing. These elements make content more discoverable and useful, as they are used by researchers and the tools they use to help drive research further. Registering as much metadata as possible helps to make important research discoveries and connections that benefit the research community and the wider world.

Conflict of Interest

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Training Material

Writing letters and emails in English: correspondence for the editorial office

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Abstract

One of the main responsibilities of the editorial office is to communicate effectively with authors through emails, formal letters, and most importantly through decision letters. Even when the content is informative and constructive and the editor has only good intentions, if the tone and level of formality are not managed properly, the image of the journal may be negatively affected, which may deter authors from submitting papers to the journal again. Despite their best efforts to treat authors respectfully, some editors may unintentionally cause offense if they lack the appropriate sociolinguistic knowledge required for effective English correspondence. In order to ease the burden of the editorial office, this tutorial aims to assist non-native English speaking editors by demonstrating the basic format and principles of writing formal letters and email, providing tips on how to select an acceptable level of formality, and offering strategies to avoid unintentional rudeness. Specific tips include framing issues positively, using indirect language, and using hedging. Through this tutorial, non-native English speaking editors are expected to develop sociolinguistic competence to write professionally and improve their efficiency in corresponding with authors.

Keywords

Academic correspondence; Politeness; Level of formality; Sociolinguistic competence; Hedging

Introduction

Preparing academic correspondence can be challenging for both students and professionals [1-3]. In particular, peer reviewers and editors of international journals may find themselves at a disadvantage when having to correspond in English if it is not their native language. Even though online resources and letter templates for correspondence are available [4,5], cultural interference can still hamper reviewers' efforts at providing critical and constructive feedback or rejecting submissions in a socially appropriate way.

Editors should also be aware that rejection letters may impact not only the submitting authors' self-image, but also the journal's image in the eyes of the authors; however, these negative effects may be reduced when letters are framed positively [6,7], delivered in a timely fashion,

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and customized to the recipient [8,9]. Early research showed that formal (as opposed to informal) forms of address in rejection letters can promote higher self-concept among job applicants, and that praise, indirectness, and explication in letters of at least moderate length can lead applicants to view the rejection letter itself more favorably [10]. By utilizing the proper level of formality and being polite, editors can further reduce unintentional miscommunication. To assist non-native English speaking (NNES) editors in the task of corresponding effectively, we provide a tutorial on crafting professional, socially appropriate letters and emails in English.

Basic Format and Principles

Formal letters

The block format of letter-writing, printed on letterhead paper, is the gold standard for business letters and is appropriate for a formal letter from a journal. Whether the message is sent by post or by email, formal correspondence in English should conform to the following guidelines.

***Font*:** Use Arial, Helvetica, or Times New Roman, 12-point.

***Heading*:** The journal name and address belong at the top. If not on letterhead, they should be typed single-spaced and preferably left-justified, although for design purposes they may also be centered or right-justified.

***Date*:** Allow one line of space between the heading and the date, which may be left- or right-justified, or centered in the case of letterhead. The construction is: month day, year (e.g., December 25, 2021). However, other formats (such as day month year, or 25 December 2021) may sometimes be employed, especially by authors from Europe.

***Inside address*:** Following four lines of space, the recipient's name, title, and address come next, single-spaced and left-justified.

***Salutation*:** Allow one line of space before the salutation. In a formal letter, the salutation should begin with "Dear" followed by the recipient's title and family name, each of which is capitalized, followed by either a colon (:), which is formal, or a comma (,), which is considered less formal. Do not include the recipient's given name on this line unless you are unable to distinguish the given name from the family name.

***Body*:** Use block style, with one line of space between each of the body paragraphs. Do not indent paragraphs. Single-space all text, maintaining left-justification.

***Closing*:** Allow one line of space following the last body paragraph, and left-justify the closing. "Sincerely," is unequivocally the best choice of salutation for closing a business letter.

***Signature and affiliation*:** After the closing salutation, allow four lines of space for the signature. The signature should be followed by the full name and title of the signatory, the affiliated institution, the institutional address, and the signatory's email address, telephone, and fax number, including relevant country and area codes.

Emails

By their very nature, emails are regarded as less formal than printed letters. Nevertheless, they can be made to appear more formal by being formatted like a printed letter using the preceding guidelines (Appendix 1). Notably, the heading, date, and inside address may be omitted in email correspondence as this information is easily found in the recipient's inbox. Furthermore, since email is already less formal than a printed letter, it may be acceptable in the first correspondence to address the recipient as "Dear" followed by first and last name without a title when the recipient's title is unknown.

After an extended period of email correspondence with the same individual, formality tends to break down. At that time, a more personal touch may be introduced by utilizing first names in the greeting once one of the signatories has used only the first name in closing. Dropping the family name in the closing gives tacit permission for the other party to switch to a first-name basis if so desired.

Whether formal or informal, emails should include a subject line that informs the reader of the main topic in a direct way. When writing a subject line, use keywords, not sentences, and try to be specific. For example, "Revision due Friday" would make a better subject line than "Notice of an upcoming deadline."

Level of Formality

Personal relationships between editors and authors, as well as one's personal style and the culture of the journal, will influence the level of formality in editorial correspondence. When corresponding with an unknown recipient, it is most appropriate to use formal diction. After building a relationship with a submitting author, however, it is possible to relax the formality slightly if this is not discordant with the customs of the journal.

Opening salutations

As English modernizes and moves towards gender-neutralization, the opening salutation line has been undergoing changes. Where possible, it is still appropriate to begin a formal letter or email with "Dear" followed by a title and family name, but which title to use is presently in flux. Titles like "Professor" or "Dr.," which are gender-neutral, can be combined with any family name as appropriate. Another advantage of the titles "Professor" and "Dr." is that they are highly unlikely to cause offense in an academic context, where it can

be assumed that most, if not all, recipients will have a doctoral degree. In contrast, "Mr." and "Ms.," while still in use by the majority population in the United States for general purposes as of this writing, may at some point be displaced by the gender-neutral "Mx." If a recipient's preferred form of address is unknown, the correspondent may choose "Mr.," "Ms.," or "Mx." (or "Dr." in an academic context) followed by the family name. Note that using someone's first name only remains too personal for a business letter, while using a family name alone without a title is disrespectful. Also, the gender-inclusive salutations "To Whom It May Concern," "Dear Sir or Madam," or "Dear Author," sound distant and impersonal.

In this changing environment, editorial boards may wish to weigh political correctness against traditional formality when deciding on a standard for their salutation line.

Closing salutations

There are a number of closing salutations in English, which vary in tone and formality (Fig. 1). In general, "Sincerely," is by far the most appropriate closing salutation for a business letter, whether writing to a stranger or to an acquaintance. Be wary of the friendly series of "Best" salutations, such as "Best regards," or "Best wishes," as these are not generally used in a business letter unless the signatory is on familiar terms with the addressee. Using "Best," alone is somewhat trendy and informal and should be avoided except when writing to friends.

Tips for Writing Formal Letters

Avoid contractions

Contractions (such as "I'd," "you're," "it's," "won't," and so on) are representations of the spoken language and should not be utilized in formal written English. Instead, write out the words in full to maintain formality.

Fig. 1. Expressions for closing salutations according to the degree of formality. Illustrated by the authors.

Avoid abbreviations

Abbreviations (such as the acronyms AIDS and NASA and the initialisms FYI and ASAP) are frequently employed in English to reduce the length of commonly used expressions. In general, it is best to avoid abbreviations in formal writing if possible. For example, FYI, meaning "for your information" and ASAP, meaning "as soon as possible" should be written out; however, acronyms that are well-established words (such as laser, which derives from "light amplification by stimulated emission of radiation") may be used without explanation, as may abbreviations that all readers in a given field would be expected to be familiar with (as with the above-mentioned example of "AIDS"). If necessary, less familiar abbreviations may be utilized after first being introduced in full, followed by the abbreviation in parentheses, like in "*Science Editing* (SE)."

Replace phrasal verbs

Phrasal verbs are verb phrases composed of two or three parts, such as a verb plus preposition, that take on a different meaning than when the verb itself is used alone. For instance, the verb "put" means "to place," but the phrasal verb "put off" means "to postpone." Phrasal verbs, especially expressions with "get," should be avoided where possible in formal writing (Table 1).

Use formal word choice

Word choice can also make writing sound more formal. For instance, single-syllable commonly used words, such as "good," are considered more informal than their multisyllabic counterparts, such as "beneficial." To employ more sophisticated language, refer to a thesaurus (https://www.thesaurus.com/) or the Academic Word List [11].

Table 1. Elements that should be avoided in writing a formal letter

	Informal	Formal
Contractions	isn't, weren't	No (replace with "is not, were not")
Abbreviations	FYI, ASAP	No (replace with "for your information, as soon as possible")
Phrasal verbs	put off, ship off	No (replace with "postpone, send")
Emoticons	;-)	No
All capital letters	SOOO GREAT	No
Conjunctions	so, but	No (can substitute "therefore, however")

Use polite expressions and sentence frames

Some NNES writers may be unaware of the connotations (evoked feelings) or lack of politeness attached to certain English words since the same words in their native language may not be offensive. For instance, when making requests in English, the word "want" should be avoided. Though the meaning is clear, the word "want" is generally considered direct, demanding, or even childish, depending on the context. Similarly, when making apologies, "I am (so) sorry" is relatively personal and may typically be found in spoken language. For a business letter, it is more appropriate to use a form of the word "apologize," which sounds both formal and polite (Table 2).

Forestalling Unintentional Rudeness

Critiquing an individual's work is a delicate matter, especially when writing in a second language where cultural differences may lead to unintentional offense. Here are some tips to help ease the delivery of corrections, criticisms, or outright rejection of submissions.

Customization, explication, and praise

Though it may be tempting to employ a letter template to reject a submission, Cortini et al. [9] have shown that customizing a rejection letter affects the perception of fairness and intention to re-apply. Editors may customize a letter by addressing the recipient formally using the author's name and title ("Dear Professor Smith," not "Dear Lisa,"); including the title of the submission; offering some lines of sincere praise for worthy aspects of the paper; and providing a gentle explanation as to why the manuscript is not suitable at this time.

Framing matters positively

Whether writing a letter of acceptance or rejection, acknowledging the research in a positive way should lead to the researcher's improved self-concept [6], while providing negative feedback may negatively affect performance on a future task [7]. In rejection letters, the editor may wish to encourage the researcher to continue to improve the paper for future resubmission once it meets the journal's standards. Rather than framing the rejection negatively ("Your submission does not meet our standards"), a positive approach with specific details may be more effective ("Your research on COVID-19 mutations is timely and would be of interest to our readers; we encourage you to resubmit your paper for consideration after expanding the methodology section and providing a more extensive discussion of the results").

Table 2. Appropriate formal expressions for making requests or apologies

Making requests	Making apologies
If possible…	Please accept our apologies…
I would appreciate it if you could…	We sincerely apologize for…
Please let us know if this will be possible…	We would like to apologize for…

Using indirect language

With the intention of being polite, editors sometimes use indirect language. While academic correspondence should be clear, specific, and polite, it is necessary to find a balance between directness, which makes the point clear, and indirectness, which is more courteous but less clear. For example, when an editor writes, "*The author might want to consider* providing X for Y," NNES authors may interpret this indirect comment as an optional suggestion and may not make any corrections. Instead, an editor could write (1) "I am not sure that I fully understand this claim" or (2) "In my opinion, Fig. 3 is an important example; however, I think XYZ are not well-summarized." These non-confrontational indirect statements should trigger a revision without hurting anyone's feelings.

In Western social convention, there is a tendency to be more indirect when giving criticism to a stranger than when giving criticism to a friend. However, excessive use of indirect language may feel circular, evasive, or tedious to some Westerners. Therefore, while indirect language may be a highly successful technique for avoiding offense, it should be used selectively and interspersed with other techniques to soften criticism in the editorial realm.

Hedging

An alternative to the circularity of indirect language is to selectively employ hedging. Hedging incorporates the intentional use of indecisive expressions to minimize certainty or to depersonalize a message. Hedging is commonly used in academic research by native speakers [12,13] and can be extended to peer review as a way to provide socially acceptable criticism. There are several ways to hedge (Table 3).

***Modal verbs*:** The modal verbs "may," "might," "could," "would," and "should" soften the expression of obligation in comparison to "must." "You must replace the nouns with pronouns" is a

Table 3. Types of hedging and some examples

Types	Examples
Modal verbs	may, might, could, would, should
Verbs of cognition	seem, tend, appear, look
Adverbs of probability	possibly, perhaps, likely, probably
Adverbs of frequency	usually, often, frequently, sometimes, occasionally, seldom

command demanding full compliance. "You should replace the nouns with pronouns" is strong advice but is not fully obligatory. "You might replace the nouns with pronouns" suggests a possibility with little to no obligation.

***Verbs of cognition*:** The "be" verb with a complement sounds very definite. Replacing it with a verb of cognition reduces the strength of the claim and, therefore, the offensiveness. "Your facts are incorrect" is a blunt statement expressing 100% certainty. "Your facts appear to be incorrect" allows a margin of error.

***Adverbs of probability*:** Adverbs of probability can be employed to express the level of definiteness. "The discussion is too abstract" is a statement of 100% certainty. "The discussion is likely too abstract" leans toward certainty, but allows for a varying opinion. "The discussion is perhaps too abstract" introduces uncertainty of an unknown dimension.

***Adverbs of frequency*:** Messages can also be moderated by selectively claiming that a condition does not exist 100% of the time. "The journal frequently accepts papers with fewer than 25 citations" is encouraging. "The journal occasionally accepts papers with fewer than 25 citations" softens discouragement.

***Selective adjectives*:** Another way to hedge is with adjectives. When we compare (1) "The conclusion needs revision" with (2) "The conclusion needs minor revision," sentence (1) sounds discouraging, while sentence (2) sounds encouraging.

***Softening "you"*:** Sentence patterns beginning with "you" can feel demanding or accusatory. As an alternative, psychologists recommend we begin with "I statements" (such as "I think" or "I believe") to let the other person know that we are speaking from our own perspective. When we compare (1) "You did not include enough data in your tables" with (2) "*I feel* that you did not include enough data in your tables," sentence (1) sounds direct and accusatory, while sentence (2) shifts the blame slightly.

***Impersonal clauses*:** To depersonalize the message, remove "I" and begin with a clause in the third person, such as in (1) "It may improve the paper to extend the methods section," and (2) "The results indicate that further analysis is warranted."

Conclusion

Editors need to be both polite and prudent when communicating with authors. Selecting an appropriate greeting and closing and using culturally acceptable statements and tone, particularly when writing rejection letters, can all be very difficult tasks for NNES editors. Becoming acquainted with the basic format and principles of writing formal letters and applying various strategies to mitigate criticism will help editors to communicate with authors with confidence and efficiency.

Conflict of Interest

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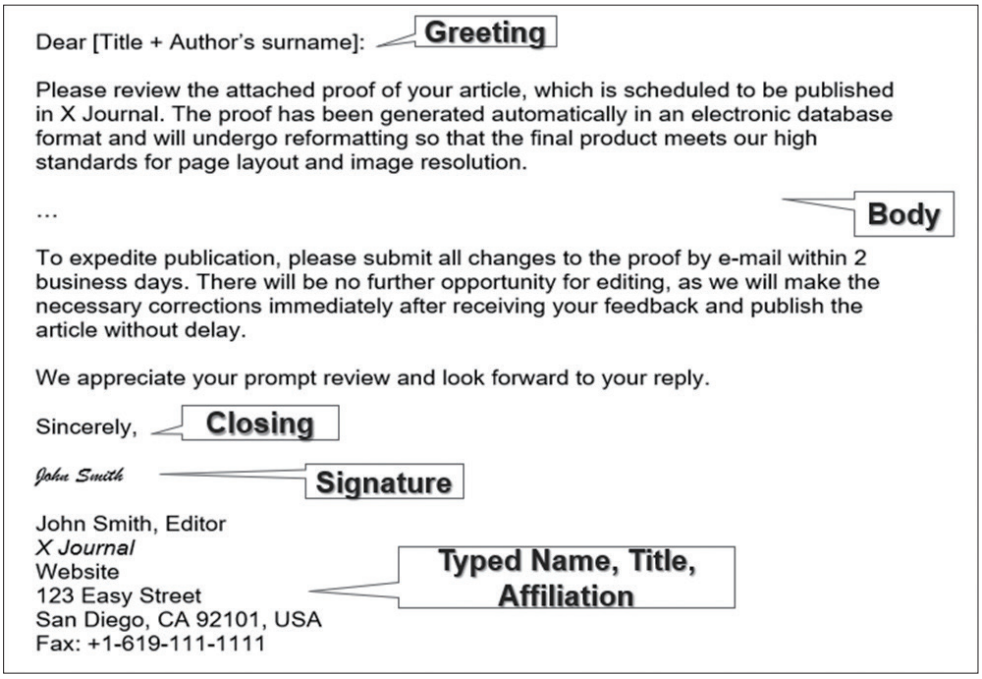
Appendix 1. Structuring a formal email



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Training Material

Scientific journals should be transformed into science storytellers to improve their visibility

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Abstract

What is the objective for science journals to publish research papers? Would it be enough to collect research manuscripts and simply publish them in print or on the web? Science journal publishers have always strived to find ways of disseminating journal content to as many readers as possible. It is now time for science journal publishers to think about why a journal should be published; whether it is acceptable for valuable scientific findings to lie dormant in a journal's archive; and whether traditional science communication is still effective. The present article suggests that science journals should transform themselves into science storytellers to improve the visibility and discoverability of their research findings. First, a new communication network between journals, authors, peers, the public, and policymakers is required. Second, conversion of media from academic language to plain language is critical to broadening the audience. Third, audio-visual content should be introduced into journal publishing to facilitate easy comprehension of the content. Fourth, research-focused channels, including EurekAlert, Medium, and social networking service channels are recommended as new media to propagate journals' content to researchers. Improving visibility and discoverability is an urgent mission, especially for small society journals. To achieve this mission, science journals should be adapted to become storytellers and science communicators, as suggested above. A small society journal's editor is not merely an editor, but an editor-publisher; therefore, editors should understand and take on this role.

Keywords

Science communication; Journal visibility; Publications; Science storytelling; Social networking

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Introduction

***Background/rationale*:** What image do people have in their mind when they think of a "science journal"? Interestingly, this image may not be clear. The word "journal" is defined in the *Oxford learner's dictionary of academic English* as "a newspaper or magazine that deals with a par-

ticular subject or profession"[1]. People may easily assume that science journals deal with various subjects in the domain of science. Here, one may ask—what images of "science" do they have? Does a picture of a physicist such as Einstein come to mind? Does a complicated equation strike them? They may think of a scientific novel that they read in childhood—or, potentially, a scientific-themed movie such as "The Terminator" or "Interstellar." The image of science might determine a person's attitudes toward "science journals." A boring image of science will result in the prejudice that a "science journal" would be boring.

Journal publishers are often concerned that their journals may fail to attract the public's interest. Therefore, they are increasingly faced with the need to solve the problem of finding ways to improve the visibility or discoverability of their journals. People's belief that scientific articles are difficult to read is a major challenge hindering efforts to improve the public's understanding of science. This issue also shapes the communication methods used to deliver journal content to readers, and science journals should find a way to successfully "deliver" their content to an audience that goes beyond their traditional readership.

The time has come for us to solve this challenge and move forward to a new age of science communication. In this new paradigm, journal publishers should shift their identity to science storytellers. Science communicators can be defined as people from any background who communicate about various science-related topics; this category encompasses non-fiction authors, journalists, bloggers, news editors, and beyond [2]. Science communicators can be seen as storytellers delivering science to a lay audience in easy-to-understand language. If they understand the values of the scientific community, and the interests and values that readers perceive, their storytelling will serve as a bridge between scientists and the public [2].

***Objectives*:** This essay suggests that science journals should transform into science storytellers to improve the visibility and discoverability of their research findings.

What is the New Science Communication Process?

Successful science communicators use appropriate skills, media, activities, and dialogue to induce responses such as awareness, enjoyment, interest, opinions, and understanding among their audience [3]. The goal of science communication is for the audience to become aware of new scientific findings, enjoy the content, become interested enough to engage with science and its communication; form science-related opinions or attitudes, and understand scientific content and social factors [3].

Journals' traditional way of communicating with authors and readers was to receive manuscripts from scientists and publish those manuscripts in print. Readers, most of whom were scientists or researchers working in a related field, then read the printed content. This framework was limited to one-way communication in a single format (text), with minimal participation by readers. Traditional science communication is still influential in scientific journal publishing. However, the internet has changed scientific journal publishing, and electronic journals have become more common than ever. Readers can access electronic versions of research articles wherever they are located. Therefore, we can say that journal articles are "consumed" rather than being "read."

Next, publishers may wonder, "How should science communication develop in this new environment?" Journals should utilize various media to deliver scientific content and findings to a wider audience multi-directionally in multiple formats. Interactional communication will encourage the audience to share their interest in scientific findings with other people and to form opinions on the content. The aim of this communication process is to create a virtuous circle between

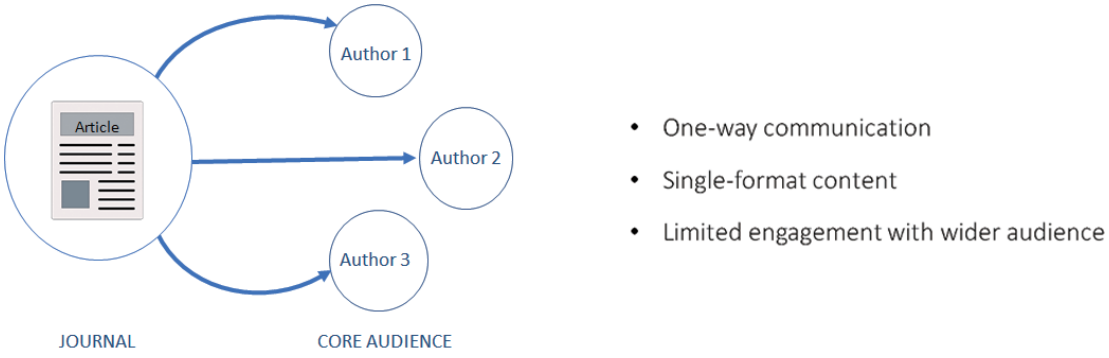

Fig. 1. Diagram of traditional science communication. Reproduced from Calamur H. Traditional science communication [Unpublished internal material]. Mumbai: Cactus Communications; 2021, with permission from Cactus Communications [4].

a journal publisher, scientists, and the audience. Fig. 1 [4] and Fig. 2 [5] illustrate how the new paradigm of science communication can be different from traditional science communication.

Media Conversion

The main objective of new science communication is to deliver content presenting new findings, scientists' passion for research, and problem-solving through science, with the ultimate goal of answering the question of how science will change our life. How do science communicators achieve this goal? Above all, they must utilize various media and formats through a process that will be called "media conversion." It should be noted that the act of transcribing scientific findings on paper is also a type of media conversion. In the current context, we need to convert print content to other media formats. Table 1 summarizes examples of media conversion.

Plain-language Summaries

Scientific findings should be presented in a format that the public can understand easily. Scientists and laypeople use different language; hence, summarizing a paper in simple, jargon-free language is the first step of media conversion. A plain-language summary aims to make scientific content easily accessible to the public, engage with a broader audience, and cross language barriers. This summary provides a foundation to convert a scientific manuscript into various formats. Four practical tips to write an attractive plain-language summary are presented as follows: (1) use simple terms; (2) avoid using sophisticated language and complex sentences; (3) do not exaggerate the implications; and (4) include all the essential findings to help readers understand the full paper.

Once a summary is created, publishers can make it easy for the public to find the summary. The following are four tips to improve the discoverability and readership of an article. (1) Write a new title optimized for search engines; (2) include graphics and artwork in the summary; (3) insert subheadings with keywords; and (4) use the summary as a basis for additional content such as social media and video summary

Cross-channel Communication

Multiple communication channels should be used to deliver scientific content to a wider audience. Having various channels is sometimes more effective than media conversion, since communication channels can form connections between a journal, scientists, and the audience. Next, shall we find channels that we can use? I would like to introduce a cross-channel communication strategy through which different channels can work together without strict boundaries. Journals can create channels for the public, researchers, and social networking services.

Table 1. Examples of media conversion

Original format	Converted format
Academic language	Simple language
Full manuscript	Summary of a manuscript
Full manuscript	Visual content (infographics, video summary)
Full manuscript	Audio content (audio summary)

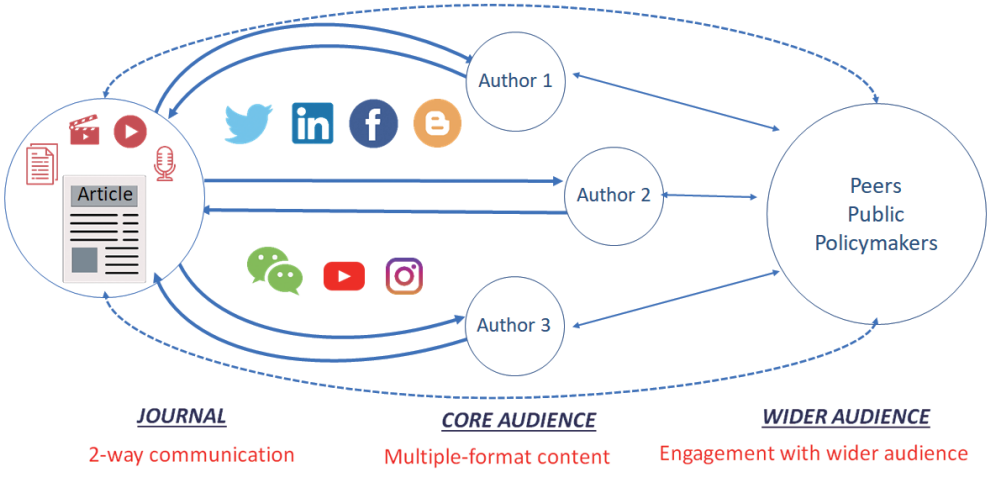

Fig. 2. Diagram of new science communication. Reproduced from Calamur H. New science communication [Unpublished internal material]. Mumbai: Cactus Communications; 2021, with permission from Cactus Communications [5].

Public Channels

Public channels are places, such as news portals, where journals can approach ordinary people directly. Unfortunately, publishing journal content through public channels can be surprisingly difficult. Hence, we need a channel to attract science journalists' attention. Direct communication with science journalists may be one approach; also, hiring news agencies such as Newswire may be another option. These agencies provide a press release distribution service, which helps to increase the likelihood of content receiving exposure to the wider public.

Research-focused Channels

Beyond public channels, journals need to have more focused channels that researchers and scientists are more likely to be drawn to, such as EurekAlert and Medium. EurekAlert is a research news portal with a favorable reputation, where journal publishers in all disciplines of research can release news articles upon payment of an annual subscription fee. Annual subscribers can post unlimited news articles during the 12-month period of their subscription [6]. Medium is an open platform where anyone can tell a story free of charge, and it aims to create a new model for digital publishing [7]. Journal publishers can transform into creative storytellers who present their superb insights for the benefit of humankind.

Social Network Service Channels

Social network service (SNS) channels provide an opportunity for journals to communicate with a broad audience interactively. SNS platforms have recently been developed to provide places where people can share information and opinions with others, beyond simply sharing updates from their personal life. Massive amounts of user-generated content are shared through YouTube, and LinkedIn can be thought of as a professional equivalent of Facebook. Table 2 shows exemplary SNS channels of three international journal publishers. These publishers tell their stories through these channels, which will become another archive of research findings.

Twitter is another tool that attracts an audience through short, eye-catching messages, and it has become a popular communication platform for researchers. Researchers believe that Twitter citations can reflect scholarly impact faster than traditional citations, as 40% of Twitter citations occur within a week [8]. Table 3 summarizes exemplary uses of SNS as a science communication format.

Alternative Metrics

Journals often wonder about how well they are working as science communicators and the impact of their content. It would be very helpful for them to have analytical tools to measure the impact of their content on society and their audi-

Table 3. Exemplary uses of SNS for science communication

SNS type	Format
Twitter	Short summary of a paper
Instagram	Catchy image with a post
Facebook	Graphical abstract, post about the paper
LinkedIn	Summary of the paper, accompanied by a link
YouTube	Slide show, video summary, video interview with authors
Blog	Summary of a paper in non-technical, simple language

SNS, social network service.

Table 2. Exemplary SNS channels

Journal publisher	SNS channel
Elsevier	YouTube: https://www.youtube.com/channel/UCnfPOvdkVXD3mIZ0a4EiNjA
	LinkedIn: https://www.linkedin.com/company/elsevier/
	Facebook: https://www.facebook.com/search/top?q=elsevier
Springer Nature	YouTube: https://www.youtube.com/channel/UCIbD6EDPsFkZFQXVfikRdIQ
	LinkedIn: https://www.linkedin.com/company/springernaturetechnologyandpublishingsolutions/
	Facebook: https://www.facebook.com/SpringerNature
PLoS	YouTube: https://www.youtube.com/user/channelplosone
	LinkedIn: https://www.linkedin.com/company/public-library-of-science/
	Facebook: https://www.facebook.com/PLOS.org

SNS, social network service.

ence. Unfortunately, the traditional citation-based metrics are not able to provide these insights. Alternative metrics are also called altmetrics to emphasize their difference from bibliometrics [9]. These new metrics can be used as options to estimate the social impact of journal content, and constitute a new way to measure public engagement with research findings [9]. These are complementary metrics that can be used with citation-based metrics by measuring the interest of the audience in journal content around the world [10]. The Altmetric service run by Digital Science and Research Solutions is an example of alternative metrics that many international journal publishers have adopted. It provides numerical data and visualizes sources from the internet to show how much attention journal content is receiving and the sources of attention using the Altmetric donut [10].

Conclusion

Many small society journals still seem to operate a simple one-way communication channel to publish manuscripts on time. Most of the participants in this communication process are researchers or members of the academic society that publishes the journal. Improving the visibility and discoverability of science journals is emerging as an urgent mission. To achieve this mission, journal editors should adapt to become storytellers and science communicators. In this new age of science communication, journals should develop various communication channels to disseminate newly converted contents in multiple formats with the public. Unlike journal editors of large commercial publishing companies, a small society journal's editor is not merely an editor, but an editor-publisher. They should catch on to this new change in the environment and adopt the suggestions outlined above for journal publishing.

Conflict of Interest

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

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science editing

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.

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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).

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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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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 healthcare 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.

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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.

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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.

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1. Author qualifications

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

2. Language

Manuscripts should be submitted in good scientific English.

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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).

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 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 maferials, editorials, book reviews, correspondence, and video clips. Other types are also negotiable with the Editorial Board.

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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.
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- **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.
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Reviews are invited by the editor and should be comprehensive analyses of specific topics. They are to be organized as follows: title page, abstract and keywords, main text (introduction, text, and conclusion), 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.

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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.

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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)[a]	References	Tables & figures
Original article	250	2,500	20	10
Review	200	5,000	100	No limits
Case study	200	2,500	20	10
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	-	-

[a]Maximum number of words is exclusive of the abstract, references, tables, and figure legends.

7. Final preparation for publication

1. Final version

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

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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.

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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.

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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.

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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

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