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## From Open Access to Open Science: Themes, Content Evolution, and Implications of Open Access Week (Postprint)

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### Abstract

[Purpose/Significance] This study investigates the themes and content of Open Access Week (OA Week) activities at home and abroad over the years, summarizes the focus areas of OA Week and the evolution of open access development, and proposes insights and recommendations for promoting open access in China.

[Method/Process] Adopting web survey methodology, this research examines the official international OA Week website and OA Week activity websites in the United States, United Kingdom, Australia, Spain, Japan, and China, summarizing the themes, content, and formats of OA Week activities.

[Results/Conclusion] Open access is undergoing an evolution from conceptual discussion to practical action, from open access to open science, from the green road to the gold road, and from fragmented actions to global collaboration. In promoting open access, China should focus on human-centered factors; enrich activity content and promotion formats; grasp the development trends of open science and strengthen infrastructure construction; and leverage the role of professional institutions while participating in global collaborative initiatives.

### Full Text

## From Open Access to Open Science: The Evolution of Open Access Week Themes, Content, and Implications

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**Abstract:** [Purpose/Significance] This paper investigates the themes and contents of Open Access Week (OAWEEK) activities over the years, summa-

rizes the focus of OAWEEK and the evolution of open access development, and proposes enlightenment and suggestions for promoting open access in China. *[Method/Process]* Using the web survey method, this study examines the international OAWEEK official website and the OAWEEK activity websites of the United States, United Kingdom, Australia, Spain, Japan, and China, summarizing the themes, content, and formats of OAWEEK activities. *[Result/Conclusion]* Open access is undergoing development from conceptual discussion to practical action, from open access to open science, from the green road to the golden road, and from decentralized action to global collaboration. In promoting open access, China should pay attention to human factors, enrich activity content and promotion forms, grasp the development trend of open science and strengthen infrastructure construction, and leverage the role of professional institutions to participate in global joint actions.

**Keywords:** Open Access Week; Open Access; Open Science **Classification Number:** G250 **DOI:** 10.13266/j.issn.0252-3116.2020.14.002

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Open Access Week (OAWEEK) is a global academic exchange activity hosted by the Scholarly Publishing and Academic Resources Coalition (SPARC). Established in 2009 based on the 2008 Open Access Day activities, it has been held for more than ten years. OAWEEK connects the global trend of open sharing with the promotion of local policy changes, providing a platform for exchange and cooperation for the academic and research communities to drive the development of Open Access (OA), thereby promoting broader participation in the open access movement, raising awareness of open access, and highlighting the value of open access in academic research [1].

To participate in and advance discussions and practices on open access, institutions from various countries or regions—including scientific and technological communities, publishing sectors, libraries, and educational institutions—organize OAWEEK activities each year around the official theme, addressing new phenomena, challenges, and problems in open access development by formulating their own themes and holding corresponding events.

Therefore, investigating and analyzing the themes of OAWEEK over the years can provide insights into the evolution and development of open access concerns and content in various countries. This paper primarily uses the web survey method to investigate and analyze the themes, content, and formats of OAWEEK activities at home and abroad in recent years, summarize the thematic evolution of OAWEEK and changes in open access development, and propose enlightenment and suggestions for promoting open access in China.

## 2. Evolution of OAWEEK Themes and Content

Before 2012, international OAWEEK activities were spontaneously organized by research institutions or universities in various countries. Since 2012, the

OAWEEK Advisory Committee (hereinafter referred to as the Committee) has designed and determined the official OAWEEK theme each year based on the latest developments and problems in open access. The Committee consists of representatives from 29 international organizations, scientific research institutions, and funding agencies, including the United Nations, the European Union, SPARC, PLOS, and the Gates Foundation [2], representing a broad academic and research community and ensuring the authority and forward-looking nature of the themes.

### **2.1 Evolution of Official OAWEEK Themes and Focus Areas**

Based on the OAWEEK official website [3-10], we compiled the official activity themes and focus areas from 2012 to 2019, as shown in [Figure 1: see original paper]. The analysis reveals that the official OAWEEK themes closely follow the progress of open access, centrally reflecting common problems and challenges encountered in the global open access movement. In terms of focus, OAWEEK themes can be divided into two stages, with 2015 as the boundary: before 2015, they mainly concentrated on promoting and discussing fundamental aspects of open access, advocating its basic concepts and impacts to establish open access as a new norm for scholarly communication; since 2015, the official OAWEEK themes have become increasingly specific and in-depth, paying greater attention to humanistic elements and equity in open access, emphasizing the construction of an open scholarly exchange environment through open collaboration and action, and promoting the open access movement at the broader level of open science.

### **2.2 Evolution of OAWEEK Themes and Content Abroad**

Preliminary surveys show that OAWEEK activities abroad have consistently followed or centered on the official themes determined by the OAWEEK Advisory Committee each year. Before 2015, foreign OAWEEK activities similarly focused on promoting and discussing fundamental open access content, such as basic concepts, significance, opportunities, and challenges, with seminars as the primary and relatively singular format. After 2015, foreign OAWEEK themes became more detailed and in-depth, extending from open access to open data, open publishing, open science, and other fields, with more diverse activity formats.

To understand recent developments in open access, this study, based on the OAWEEK official website event list [11] and considering the richness and diversity of content and formats, as well as national support for and practice of open access, selected developed countries including the United States, United Kingdom, Australia, Spain, and Japan as representative cases for investigation. By organizing and analyzing various activities held during OAWEEK in these countries since 2015, we summarize the evolution of foreign OAWEEK themes and content.

**2.2.1 United States** As the birthplace of OAWEEK, the United States demonstrates high participation in OAWEEK activities. A survey of small and medium-sized academic libraries in the U.S. [12] showed that between 2009 and 2013, participating university libraries increased from 3 to 17, indicating that over time, more U.S. university libraries began to focus on and promote open access. The University of California, Duke University, and Florida State University are all active participants. This paper uses the University of California as an example to introduce its participation in OAWEEK.

The University of California (UC) is an active promoter of the open access movement and a loyal participant in international OAWEEK. Except for 2013 [13] and 2015 [14] when it formulated open access policies, UC campus libraries have celebrated International OAWEEK annually since 2009 by organizing various activities. We compiled UC campus OAWEEK activities from 2016 to 2019, as shown in .

From 2016 to 2019, UC's OAWEEK adopted the official OAWEEK themes, but in terms of specific content, UC placed special emphasis on practical problems researchers encountered during their research process and actively provided solutions. For example, copyright issues have run through UC's OAWEEK themes in recent years. UC Berkeley annually provides practical workflows and advice to help researchers resolve copyright issues and legal considerations during the submission-to-publication process, helping authors understand available resources, their rights, and the significance of sharing papers online [19]. Open access policies have also been an important topic in OAWEEK over the years. In 2015, UC released a new open access policy (UC Presidential Open Access Policy), expanding the open access rights and responsibilities of all UC authors. Subsequent OAWEEK events incorporated UC's open access policy into discussions, guiding participants to understand and learn about it, and providing authors with tips and insider information on using funding to pay Article Processing Charges (APCs). In recent years, UC OAWEEK's focus has gradually shifted to open data and open science. The Santa Barbara campus explored opportunities for expanded access to spatial research data, discussing challenges in open access to spatial data throughout the lifecycle; the Riverside campus discussed steps to take when creating datasets using open data and introduced the Open Science Framework (OSF), a tool that organizes and makes project data and documents accessible, thereby improving work efficiency and visibility.

In terms of activity formats, UC's OAWEEK activities have basically adopted seminars, but also included fun and novel formats such as games and tours. In 2016, UCLA held an activity touring the library's back-end collections, services, and spaces. Invited faculty used an "Open Access Pass" printed with personal name and department information to tour the library's back end and receive personalized librarian Q&A services, including content on UC open access policy, ORCID, data management services, etc. [21]. This personalized, customized service for faculty and staff not only helps them deeply understand open access and solve their problems but also serves as beneficial publicity for

library services.

**2.2.2 United Kingdom** Based on the OAWEEK official website [22] and UK university library websites, we compiled UK OAWEEK activities from 2015 to 2019, as shown in .

Different UK universities and institutions have different focuses in their OAWEEK content. The University of British Columbia focused on key issues of open collaboration, exploring cooperation among stakeholders and methods to make “openness” the default mode of scholarly communication, providing collaboration opportunities for open access, open education, and open data supporters to advance common goals more quickly [23]. Cambridge University conducted open research projects for STEM doctoral students [24] and discussed open access in different disciplines [25]. University College London’s focus was on RPS and REF open access policies [26-28], and in terms of data sharing, the focus evolved from the importance of data sharing to the fairness of data sharing. As a public library, the British Library (BL) paid more attention to digitization of collections and their impact, and open cultural heritage content. Of course, these institutions’ OAWEEK activities also had similarities, such as gradually extending discussion from open access, open research, data sharing, open publishing, and open education to open science, maintaining some consistency with the evolution of international OAWEEK themes.

On September 4, 2018, 11 European national research funding agencies and the European Research Council (ERC) released Plan S [29], explicitly requiring that from January 1, 2020, papers from funded projects must be published in compliant open access journals or platforms with immediate open access. The UK is one of the 11 signatory countries to Plan S. In the 2018-2019 OAWEEK, three institutions discussed Plan S. Cambridge University released a podcast about the meaning of Plan S and invited the Open Knowledge Librarian from North Carolina State University Libraries to share views on Plan S’s potential impact on libraries, publishers, researchers, and repositories [30] to gather different perspectives. UCL held meetings about Plan S [27]; BL expressed some concerns about Plan S’s impact on humanities publishing [31].

UK OAWEEK activity formats are rich and diverse. Before activities, OAWEEK is promoted through flyers and posters. During activities, seminars, webinars, and training courses are the main formats, while blog posts about OAWEEK are published on relevant institutional websites and topics are posted on social media like Twitter, providing opportunities for interaction.

**2.2.3 Australia** Based on information from the Australian Open Access Support Group (AOASG) website [32], we compiled the themes and formats of OAWEEK activities at some Australian universities from 2015 to 2019, as shown in .

Australian OAWEEK activities each year generally reflect that year's official OAWEEK theme, with activity content continuously enriched as the open access movement develops. In terms of content, the 2015 OAWEEK focused on “open collaboration,” leading to multiple universities co-hosting the “Open Collaboration—International OAWEEK Seminar” [33] and helping scholars visit the Australian National University to speak about challenges and necessities of open data [34]. In subsequent years, open publishing became an important topic in Australian OAWEEK activities, with in-depth discussions on specific actions for open publishing [35], covering publishing agreements, copyright issues, platform tools, open access journals, open access books, and open repositories, as well as how to avoid predatory publishers. Open education is also a focus for many Australian universities [36], with seminar content covering open education practice (OEP), open education resources (OER), and open education grants.

Notably, in 2018, many universities in Oceania and globally screened the documentary *Paywall: The Business of Scholarship* during OAWEEK [37], which pointed out that libraries' unsustainable subscription fees are an obstacle to the open access movement. By comparing global efforts to achieve open access with top publishers' resistance to open access, it proposed that publicly funded research results should not be trapped behind paywalls, highlighting equity in open access. In 2019, Australian OAWEEK focused on “open data,” with universities holding activities around this theme, such as lectures discussing controversies in open data [38], and identifying open access, open data, and open education practice as key areas of the open movement [39].

In terms of activity formats, universities have mainly used seminars over the years. In recent years, new activity formats such as webinars, video screenings, online games, and librarian interactions have emerged, with online activities gradually becoming mainstream and effectively embedded in the research, teaching, and learning processes of faculty, researchers, and students. AOASG actively engages with international organizations like SPARC to gather open access information from Australia and globally, guiding Australian universities to cooperate in holding activities and effectively promoting OAWEEK.

**2.2.4 Spain** Based on information from the Spanish University Library Network (REBIUN) website [40], we compiled the themes and formats of OAWEEK activities at some Spanish universities from 2015 to 2019, as shown in .

In terms of content, Spanish OAWEEK has broad concerns. In 2015, Spanish universities held open access seminars [41] and workshops [42] to promote basic open access content and implementation pathways. In 2016, university activities actively responded to the OAWEEK official theme “Open in Action,” focusing on concepts, implementation technologies, policy backgrounds, challenges, and countermeasures for open data [43], shifting focus toward open scientific information, open science, etc. [44], promoting scientific research across society while respecting intellectual property rights. In 2017, open access publisher MDPI cooperated with universities to organize seminars discussing differences between

open access and publishing models and promoting its journals and services [45]; scholars also studied the open science movement in student education, considering obstacles and opportunities brought by open access and reflecting on open access goals [46]. In 2018, Spanish OAWEEK focused on open data. As institutional repositories (IR) are important archives for educational and research institutions to preserve, utilize, and disseminate their knowledge assets and represent the “green road” to achieving open access, IR promotion was also important content in activities, with multiple universities holding activities involving research data sharing and management as well as IR promotion and practical operations [47-48]. In 2019, Spanish OAWEEK focused on open science, with many universities including this theme in their activities, such as introducing different aspects of open science through online MOOCs, including open science introduction, open access publications, open research data, research evaluation, etc. [49]; some universities introduced data management and preservation, research innovation, etc. through Twitter posts [50]; in addition to rich lectures, some universities launched online games to increase participants’ understanding of open access and open science, becoming highlights of activities.

In terms of activity formats, compared with other countries, Spanish activities are more diverse and interesting. Online activities include fun games, MOOC training, radio publicity, and social media promotion, while offline activities are mainly seminars. They also emphasize cooperation with colleges to conduct targeted training and publicity, focusing on improving student groups’ understanding and practical IR operation capabilities.

**2.2.5 Japan** As a SPARC institutional member, SPARC Japan has hosted four SPARC Japan seminars for OAWEEK since 2016. Based on the SPARC Japan blog [51], we compiled Japanese OAWEEK activities from 2016 to 2019, as shown in .

The Japanese government recognized the significance of “open science” early on, releasing the “Promoting Open Science in Japan” report in 2015 to advocate for public provision of research data. To accelerate research data openness, SPARC Japan’s 2016 OAWEEK theme focused on specific actions for “open data,” discussing the significance of open data, incentive measures for researchers, and the important role of libraries and institutional repositories in data management [52], guiding librarians and researchers to cooperate in promoting Japanese research data openness. In 2017, Japanese OAWEEK focused on open access implementation paths, namely open storage (green OA) and open publishing (gold OA). The seminar reviewed the role and management control of preprint servers over 30 years and discussed how they contribute to scientific development, while also exploring the importance of commercial publications, sustainable publishing models, and paper quality control issues [53]. Information quality control is crucial for accelerating open science, so in 2018, Japanese OAWEEK continued the 2017 theme, focusing on “quality control.” This seminar discussed quality control perspectives in the open science era and how to ensure content quality

[54], proposing that open quality control systems should extend beyond specific research groups and across different disciplines, distinguishing them from conventional peer review. In 2019, Japanese OAWEEK responded to the official theme “Equity in Open Knowledge,” pointing out that all disciplines need open science, and that openness in humanities and social sciences will become increasingly important. The seminar focused on implemented plans in open research [55], attempting to develop broad and stable open science in humanities and social sciences.

In terms of activity formats, Japanese OAWEEK has been held as seminars over the years, inviting domestic and foreign experts to give special lectures and exchange open access research and practices. In summary, Japanese OAWEEK themes have well echoed the official OAWEEK themes, conducted in-depth discussions on phenomena and problems in Japan’s open access and open science development process, horizontally expanded applicable fields of open science, and vertically deepened specific actions for open science.

### 2.3 Evolution of OAWEEK Themes and Content in China

China is an active participant and promoter of international OAWEEK. Since 2012, the National Science Library of the Chinese Academy of Sciences has held China Open Access Week annually in October in synchronization with international OAWEEK. By 2019, it had been held for eight consecutive years. China Open Access Week has become a major forum for domestic and foreign funding agencies, scientific communities, library and information communities, and publishing communities to jointly discuss trends, strategies, mechanisms, policies, and best practices for open access and open science [56].

The themes of China’s OAWEEK activities from 2012 to 2019 are shown in .

From the themes and content of China’s OAWEEK over the years, it is evident that China’s OAWEEK keeps pace with international trends while conducting specific and in-depth discussions on practical problems facing Chinese academia and publishing based on their characteristics. From 2012 to 2014, China’s OAWEEK activities focused on the two practical forms of open access—open storage and open publishing—mainly concerning institutional repositories (IR) and related issues of open publishing, such as IR development trends, challenges, current status, open access policies, open publishing practices, and promotion of related resources. In 2015-2016, OAWEEK gradually moved to specific actions and practices for open access, open publishing, open education, and open data [60-61]. After 2017, China’s OAWEEK began focusing on the theme of open science, with discussion content gradually expanding from definitions, principles, and significance of open science to a series of issues involving open science, including open data, open access resources, open infrastructure, etc., and began exploring open science development paths suitable for China.

In terms of activity formats, compared with foreign fun games, MOOC training, film screenings, and other rich activity formats, domestic OAWEEK activities

are relatively fixed, mainly using presentations and discussions to explore issues and setting up related exhibitions to improve participants' understanding of open access.

### 3. Development of Open Access as Seen Through OAWEEK Themes and Content

#### 3.1 From Conceptual Discussion to Practical Action

After the release of the Budapest Open Access Initiative in 2002, open access began to widely enter researchers' vision. The establishment of international OAWEEK in 2009 provided an opportunity for the global academic community to jointly promote the open access movement. In 2012, international OAWEEK determined the official theme "Set the Default to Open Access," promoting open access to become a new norm for academic research. In 2013, focusing on the theme "Redefining Impact," it promoted the basic connotation of open access and clarified its impact on changing academic evaluation methods. In 2014, focusing on "Open Access Generation," it discussed the impact of open access on researchers at different career stages. Early OAWEEK discussions centered on concepts, implementation pathways, and the impact and significance of open access, remaining at the theoretical discussion level. Since then, OAWEEK has shifted from conceptual discussion to practical action. Countries have formulated open access and data management policies to actively address challenges and problems in promoting open access. In 2014, China's National Natural Science Foundation (NSFC) released the "NSFC Policy Statement on Open Access to Research Papers from Funded Projects," stipulating that papers from projects fully or partially funded by NSFC would be made open access within 12 months after publication. In 2015, the University of California formulated an open access policy making academic articles written by UC authors freely and publicly accessible, expanding the scope of authors from faculty to all UC system authors, including graduate students, postdocs, and librarians, based on its 2013 policy. Countries' OAWEEK activities also discuss and learn from their own formulated policies. Problems facing open data, open education, and open access resources have gradually received attention and solutions.

#### 3.2 From Open Access to Open Science

We compiled the focus areas of domestic and foreign OAWEEK activities in the past five years (see ) and found that the focus has shifted from open access and open data to open science. [Figure 2: see original paper] intuitively shows this evolution. Early OAWEEK focused more on promoting basic connotations of open access, such as basic concepts and implementation pathways, as well as discussing its significance. Promoting institutional repositories and open access journals was also important content in domestic and foreign OAWEEK. The open data movement began worldwide in 2009 and has continuously developed, with more universities and research centers establishing open scientific data sys-

tems to promote acquisition, reuse, and sharing of scientific data. According to a 2018 annual report released by Figshare, open data is increasingly penetrating various research fields [62]. Open data has been a key focus in domestic and foreign OAWEEK in recent years. Since the FAIR (Findable, Accessible, Interoperable, Reusable) data principles were proposed in March 2016, countries' OAWEEK concerns regarding open data have shifted from data sharing to broader data accessibility and reuse. Open science has emerged based on open access and open data [63], involving open sharing of knowledge throughout the entire research lifecycle, representing an extension of open access. Open publishing, open data, open education, and open repositories are all important elements of open science. Open collaboration between researchers and research institutions is also key to promoting open access and open science. Domestic OAWEEK began using open science as its theme in 2017, with content gradually expanding from open science development paths and policies to open science practices. Foreign OAWEEK also introduced basic meanings of open science, open data, and research innovation. University College London (UCL) also held an Open Science Day [64], discussing various aspects of open science, demonstrating the importance attached to open science. In practice, in 2016, the European Commission proposed the European Open Science Cloud (EOSC) project and in March 2018 proposed six action routes for architecture, data, services, access and interfaces, rules, and governance, aiming to integrate existing and emerging data infrastructure to provide world-class data infrastructure and cloud-based services for European researchers [65]. In July 2018, the U.S. National Academies released the report "Open Science by Design: Realizing a Vision for 21st Century Research," providing recommendations for promoting open science development [66]. Open science has gradually been implemented in action.

### 3.3 From Green Road to Golden Road

Open access has two implementation pathways: green OA and golden OA. In recent years, open access development has experienced a transformation from open storage to open publishing. In early OAWEEK activities, promoting institutional repositories was one of the main contents. For example, in 2009, the University of California launched the eScholarship repository [67] and demonstrated its usage methods to users. China's OAWEEK in the first three years focused more on the construction, use, evaluation methods, and future development directions of Chinese institutional repositories. After the "OA2020 Initiative" was launched by the Max Planck Society and other institutions on March 21, 2016, open publishing has increasingly become a focus of attention. China's 2017 OAWEEK closely followed international trends, focusing on the "OA2020 Initiative," introducing its concepts and the German scientific community's practice in promoting open access publishing transformation [58]. After the release of Plan S in September 2018, it triggered discussions in various countries. China also invited Dr. J. Rooryck, a leader of Plan S, to introduce the ten principles and revised implementation guidelines of Plan S [59] during OAWEEK, enabling

more Chinese researchers to understand Plan S.

In action, the University of California expressed absolute support for open access and open publishing: on February 28, 2019, UC announced that all 10 campuses would stop paying subscription fees to Elsevier for its publications and would not renew its database [68]. Publishers and universities/research institutions have been in constant negotiation. In 2019, the world's largest academic publisher Elsevier reached open access transformation agreements with research institutions in Germany, Sweden, France, Hungary, and other countries, transforming the traditional subscription model to the "Read & Publish" open access publishing model; transformation agreements with publishers such as Springer Nature, Wiley, and Oxford University Press (OUP) are also continuously taking effect. In January 2020, Springer Nature signed the world's largest transformative open access agreement with Projekt DEAL in Germany, providing open publishing services for scholars and students across the German research community and full read access to Springer Nature journals [69]. In May 2020, the National Science Library of the Chinese Academy of Sciences reached the first open publishing transformation agreement in China with OUP, supporting 26 CAS institutes and their researchers to access OUP's scientific subscription journals or papers and publish a certain number of open publishing papers in these journals for free [71]. Open publishing has become one of the mainstream models of academic publishing.

### 3.4 From Decentralized Action to Global Collaboration

Overall, domestic and foreign OA WEEK focus has evolved from open access to open science. However, in the early development stage, countries' activity themes and specific content had significant differences, with decentralized actions in promoting the open access movement and a lack of globally consistent measures, leading to flat open access development with few breakthroughs. In 2016, the Max Planck Society in Germany launched the "OA2020 Initiative," and the world began to take joint action. As of April 2, 2020, 143 academic institutions worldwide had formally signed the Expression of Interest in the large-scale implementation of open access to scholarly journals (EoI) [70], jointly committed to achieving large-scale transformation of academic journals to open access. In 2018, Plan S, initiated by major research funding agencies from 11 European countries including France, the UK, and the Netherlands, received broad support from the global scientific and library communities, with institutions such as Harvard University, MIT, and the European Academies Science Advisory Council (ALLEA) expressing support for Plan S and its goals in their feedback on implementation principles. The Association of Learned and Professional Society Publishers (ALPSP) and the Open Access Scholarly Publishers Association (OASPA) expressed principled support. At the 14th Berlin Open Access Conference in 2018, China's NSFC, the National Science and Technology Library (NSTL), and the National Science Library of CAS released position statements, clearly expressing China's support for OA2020 and Plan S. The pro-

posal of Plan S created a huge impact, with journal editorial boards collectively resigning due to dissatisfaction with Elsevier's open publishing policy, the Max Planck Society and the University of California terminating agreements with Elsevier, and now major publishers signing transformation agreements with research institutions in various countries. The world has begun to unite and take strong action to promote open access.

## **4. Implications of Open Access Development for Promoting Open Access in China**

### **4.1 Focus on Human Factors in Open Access and Improve Social Participation**

International OAWEEK themes strongly emphasize “human” factors. Since 2015, they have successively focused on open collaboration among people, encouraging more personnel to participate in open actions, pointing out tangible benefits of open access such as poverty alleviation and public welfare promotion, and paying attention to equity issues in academic systems and social development, highlighting a people-oriented philosophy and reflecting the openness, socialization, and shared cooperation characteristics of open science [72]. In contrast, Chinese OAWEEK themes in recent years have mainly focused on discussions and practices of open access and open science at the scientific research level, with less attention to the impact of open access on individuals and society. Research subjects of open access are mainly limited to the library and publishing communities, with insufficient participation from academia and society. Additionally, while most foreign universities prominently feature open access-related columns on their library homepages to introduce basic open access knowledge, its significance to readers, and related library services, this is relatively rare in China, reflecting that domestic libraries need to strengthen open access promotion and attract readers to participate. Therefore, in promoting open access, China should attach importance to “human” factors. OAWEEK themes should further focus on equity in the transition process, exploring highly inclusive open research environments applicable to all stakeholders. In specific library operations, all pathways to achieve open access should be supported, new open access publishing business models should be explored, and users should be provided with open access resource support and information guidance to build an open, inclusive, and fair ecosystem for academic research, attracting broader research communities and the public to jointly accelerate the transition to open access.

### **4.2 Enrich Activity Content and Promotion Forms, Emphasize Communication Effectiveness**

Research shows that foreign OAWEEK activities have rich content and diverse formats. Online activity formats include MOOCs, video screenings, online courses, webinars, online lectures, fun games, and social media interactions. Offline activities mainly include presentations, seminars, workshops, librarian

exchanges, and college cooperation, with great emphasis on interaction and cooperation between librarians and faculty/students, deeply embedding into user groups with good activity effectiveness. In comparison, China's OAWEEK activities are mainly promoted by libraries, with only a few libraries having conducted such activities, low popularity, and promotion formats mainly limited to seminars that are relatively monotonous and dull, with communication scope and effectiveness needing improvement. In future open access promotion activities, first, the popularity of activities should be expanded, calling for broader participation and exchange among university and public libraries to promote open access activities everywhere. Second, the depth of open access promotion should be enhanced, such as encouraging librarians to conduct in-depth cooperation with colleges and student groups, more intuitively popularizing the significance of open access for scientific research and academic exchange through face-to-face forms, advocating librarians to conduct science popularization activities for the public, and using online publicity and offline exhibitions to help the public understand basic open access knowledge and improve public recognition and understanding of open access. Finally, activity content and formats should be innovated, such as incorporating open access knowledge competitions, developing open access-related games, and conducting fun debates, group discussions, and simulated negotiations to enhance activity fun and improve participants' learning effects. Only by continuously promoting activity popularization and deepening, enriching activity content and promotion forms, can we effectively improve communication effectiveness and attract broader groups to join the practice of supporting and promoting open access development.

### **4.3 Grasp the Development Trend of Open Science and Strengthen Infrastructure Construction**

Open science covers a broader scientific research lifecycle. From the perspective of international OAWEEK themes over the years, moving from open access to open science is the general trend of open access development. Open science infrastructure is the foundation of open science, providing resource and platform support for open science. Foreign open science infrastructure was established earlier with rich practical experience. For example, as early as 2009, the EU funded the establishment of OpenAIRE (European Open Access Infrastructure Research Project), aiming to make open science a reality in Europe and beyond [73], which has operated effectively to date. The European Research Library Association (LIBER) emphasized in its 2018 "LIBER Open Science Roadmap" that research infrastructure and EOSC are core areas of open science [73]. In recent years, SCOSS (Global Sustainability Coalition for Open Science Services) [74] and IOI (Invest in Open Infrastructure) [75] projects led by SPARC Europe have also been flourishing. In contrast, China's existing open science infrastructure mainly consists of various scientific data sharing platforms [76], with no open science-related academic organizations and few publicly shared open science infrastructures and powerful open access platforms and tools. As open access develops broadly toward open science, China urgently needs to develop open

science infrastructure, drawing on successful experiences from existing foreign projects, promoting cross-institutional cooperation, diversifying the infrastructure ecosystem, and increasing investment in research infrastructure to build an open sharing platform environment for Chinese researchers and provide one-stop services for research data storage, sharing, and utilization, promoting open cooperation in scientific research information.

#### 4.4 Leverage the Role of Professional Institutions and Participate in Global Joint Actions

The role of professional institutions in promoting international open access cannot be underestimated. Whether AOASG, REBIUN, or SPARC Japan, all have clear mission objectives and scope of responsibilities, playing important leadership roles in promoting national-level open access transitions and enhancing international open access cooperation and exchange. In addition, a large number of foreign universities participate in OA WEEK activities, with frequent international cooperation and broad participation groups, also playing an important role in promoting open access locally and globally. In China, libraries, as professional institutions of academic information services, are the main body promoting open access [77]. Given that China's open access movement is still in its initial stage, lacking overall coordination and policy guidance, libraries should in the future: clarify their leadership role in promoting open access popularization and implementing open publishing transformation; apply professional expertise to provide researchers with open access-related information, guidance, and in-depth services; leverage institutional advantages to create China's own open access policies supporting all open access development paths; actively take action to build academic organizations committed to achieving open access to Chinese scientific research, calling for national-level attention and support for open access. At the international level, libraries need to track international development trends, actively join international open access planning, alliance building, academic conferences, international activities, and infrastructure construction, integrate with the international open access movement, exert China's influence, safeguard China's interests, and assist the transformation of scientific research in China and the world to open access.

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**Abstract:** *[Purpose/significance]* This paper investigates the themes and contents of Open Access Week (OAWEEK) activities over the years, summarizes the focus of OAWEEK and the evolution of open access development, and proposes enlightenment and suggestions for promoting open access in China. *[Method/process]* Using the web survey method, this study examines the international OAWEEK official website and the OAWEEK activity websites of

the United States, United Kingdom, Australia, Spain, Japan, and China, and summarizes the themes, contents, and forms of OAWEEK activities. *[Result/conclusion]* Open access is undergoing development from conceptual discussion to practical action, from open access to open science, from green road to golden road, and from decentralized action to global collaboration. In promoting open access, we should pay attention to human factors; enrich activity content and promotion forms; grasp the development trend of open science and strengthen infrastructure construction; promote the role of professional institutions and participate in global joint actions.

**Keywords:** open access week; open access; open science

*Note: Figure translations are in progress. See original paper for figures.*

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