Research on New Media Services for Scientific Research in Professional Libraries Under the COVID-19 Pandemic: A Case Study of "China Science News" from the National Science Library, Chinese Academy of Sciences (Postprint)

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Abstract

[Purpose/Significance] Taking "Science China" (中国科讯) of the National Science Library, Chinese Academy of Sciences as an example, this paper analyzes the initiatives and effectiveness of emergency science communication services in specialized libraries, providing reference for such services under emergency events.

[Method/Process] The service content pushed by the "Science China" WeChat official account during the COVID-19 pandemic was systematically reviewed. User attention to different content types was analyzed through daily average user growth and readership metrics, and considerations for emergency science communication services were proposed.

[Results/Conclusion] During the pandemic, "Science China" exhibited significant daily average user growth, with electronic resource support content achieving the highest readership, followed by content on SARS-CoV-2 research progress. Popular science livestreams and information literacy education livestreams attracted tens of thousands of viewers. Under emergency events, specialized libraries should strengthen publicity of characteristic services and enhance information screening and verification mechanisms. The absence of emergency science communication contingency plans for major public health events also warrants attention.

Full Text

Research on New Media Services for Scientific Research in Professional Libraries Under the COVID-19 Pandemic: A Case Study of "Sci-Think" from the National Science Library, Chinese Academy of Sciences

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Abstract: [**Purpose/Significance**] Taking "Sci-Think" of the National Science Library, Chinese Academy of Sciences as an example, this paper analyzes the measures and effectiveness of emergency science communication services in professional libraries, providing reference for scientific communication services of professional libraries during emergency events. [**Method/Process**] By sorting out the service content pushed by the "Sci-Think" WeChat official account during the COVID-19 pandemic, this paper analyzes the degree of user attention to different types of content from the perspective of average daily user growth and reading volume, and proposes reflections on emergency science communication services. [**Result/Conclusion**] During the pandemic, "Sci-Think" experienced significant average daily user growth, with electronic resource guarantee content receiving the highest reading volume, followed by content related to scientific and technological progress in COVID-19 research. Popular science live broadcasts and information literacy education live broadcasts attracted tens of thousands of viewers. During emergencies, professional libraries should strengthen the promotion of characteristic services, enhance information selection and review mechanisms, and also pay attention to the lack of emergency science communication work plans for major public health events.

Keywords: professional library; COVID-19 pandemic; emergency science communication; Sci-Think
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Since December 2019, the novel coronavirus pneumonia epidemic has spread across China and globally, with confirmed cases worldwide exceeding 100,000. On February 28, 2020, the WHO raised the global risk level of the COVID-19 pandemic to the highest level "very high," calling on all countries to prepare comprehensively for epidemic prevention and control [1]. This represents the most significant public health emergency in China since its founding, characterized by the fastest transmission speed, widest infection range, and longest duration. The sudden outbreak has brought immeasurable impacts on people's

lives and socio-economic development.

As public welfare information dissemination institutions, libraries bear an undeniable responsibility for emergency science communication services during emergencies [2]. The National Science Library, Chinese Academy of Sciences (hereinafter referred to as "the Library") serves as a modern national science library featuring digital, networked, and knowledge-based services, consistently leading China's research system library sector. During this pandemic, the Library actively leveraged its professional expertise to rapidly construct support services, striving to participate in combating the novel coronavirus through effective initiatives in electronic resource guarantee, thematic knowledge base construction, scientific decision support, assistance in scientific research offensives, and popular science resource promotion.

In the information age, new media has become a primary channel for library service promotion and publicity [3]. "Sci-Think" is a carefully crafted mobile internet-based multi-platform knowledge service brand developed by the Library, encompassing an APP, web version, and WeChat official account and Weibo platform series. This platform serves as both an effective supplement to the Library's literature guarantee—integrating CAS-procured digital scientific literature resources, important scientific progress reports, and other scientific intelligence products to support researchers, students, and science managers in accessing literature and scientific information anytime—and as a window for external publicity, organizing, promoting, and disseminating the Library's quality products and services through its high-traffic multi-platform channels throughout the entire research innovation process. The goal is to establish "Sci-Think" as an important, influential knowledge service platform with a substantial user base among scientific researchers.

During the pandemic, "Sci-Think" responded swiftly, leveraging new media's rapid dissemination advantages to publicize the Library's various emergency services, effectively enhancing service depth and breadth to meet researchers' knowledge service demands quickly. Based on sorting out "Sci-Think" information service content during the epidemic and analyzing the dissemination and usage effects of different content types, this study obtained feedback from the public, especially researchers, on professional libraries' emergency services, and proposes reflections on emergency science communication services for professional libraries.

1 "Sci-Think" Emergency Science Communication Service Content

1.1 Electronic Resource Guarantee Service Information Dissemination

Since the COVID-19 outbreak, various departments of the Library have rapidly organized teams to devote themselves to literature intelligence guarantee sup-

port work, breaking service barriers between departments, proactively thinking, and establishing cross-departmental project teams to provide effective guarantees for COVID-19 scientific research offensives and other research activities through remote literature access, epidemic frontier monitoring, platform construction support, and decision-making assistance. The "Sci-Think" platform, as the Library's window and platform for resource and service publicity, actively cooperated with various project teams, leveraging its new media team advantages to select better dissemination channels and presentation methods to spread the Library's pandemic response work faster and more effectively, demonstrating the professional library's sense of responsibility and making its due contribution to fighting the epidemic.

Due to the pandemic, researchers' and students' work and school schedules were delayed, while the period around the Spring Festival is precisely a critical time node when researchers prepare National Natural Science Foundation proposals and graduating students work on their theses—the period of peak literature demand. Consequently, subject librarians successively received consultation requests regarding remote database access. Since its establishment in 2016, "Sci-Think" fully anticipated researchers' growing dependence on electronic resources, constructing a "China Science Network Unified Authentication" cross-domain authentication access system based on Shibboleth that breaks through IP address restrictions to enable mobile full-text access. Currently, "Sci-Think" has integrated resources from 17 internationally renowned publishers (see Figure 1 [Figure 1: see original paper]). The "Sci-Think" WeChat official account promptly pushed information on how to use the web version and other free database resources, meeting some research users' needs during the early pandemic stage.

As the pandemic developed and work resumption was further postponed, the 17 publishers' resources could no longer satisfy research users' demands. Unlike domestic universities, CAS electronic resource procurement involves multiple coexisting procurement methods with inconsistent resource subscriptions across institutes. To meet researchers' literature needs as quickly as possible, the Library's Resource Construction Department urgently initiated negotiations with various database providers, while the Information Systems Department launched technical development, rapidly implementing WebVPN-based access to the entire CAS database resources for all CAS units. To date, remote services for 66 digital academic resources have been activated. Leveraging its large research user base and rapid message dissemination advantages, the "Sci-Think" WeChat official account released information about this emergency measure, facilitating CAS researchers to quickly understand and utilize the resources. Currently, "Sci-Think" has published information on logging into electronic resource databases via "WebVPN," promptly informing research users of changes in available resources.

1.2 Publishing Original Reports on the Novel Coronavirus

As a leading scientific knowledge service institution and strategic intelligence research organization in China, the Library's intelligence team researchers proactively considered key issues related to emergency medical scientific research, including diagnosis, detection, vaccine development, and intellectual property dynamics of chemical drugs, planning and organizing a series of thematic analysis research reports and dynamic monitoring bulletins to effectively support strategic decision-making consulting. These intelligence products were also disseminated through the "Sci-Think" platform to meet public and scientific community intelligence needs, as detailed in Table 1 .

1.3 Novel Coronavirus Pneumonia Popular Science Lecture Live Broadcast

Due to the high uncertainty and strong infectivity of the novel coronavirus, people often experience tension, fear, and anxiety when facing the epidemic [4]. While adults can learn about the virus through the internet to alleviate tension, teenagers and elderly people have limited ability and channels to obtain knowledge. Libraries should actively utilize their expert resource database to disseminate emergency scientific knowledge to the public with an objective and impartial stance, alleviating panic among the public, especially teenagers and the elderly. "Scientist Forum" is a characteristic brand of the Library's scientific culture dissemination, primarily inviting academicians and renowned scientists from China and abroad to lecture, aiming to pair scientific knowledge with popularization, integrate scientific frontiers with daily life, thereby broadening the public's scientific horizons, expanding scientific knowledge, and enriching scientific life. During the pandemic, the "Scientist Forum" team planned a popular science lecture titled "Secrets of Viruses," live-streamed through the "Sci-Think" platform and primarily targeting teenagers, using vivid language and images to explain coronavirus-related knowledge and eliminate doubts and fears.

1.4 CAS Research Information Literacy Lecture Hall

The Library's subject librarian team annually provides centralized services to responsible institutes during spring and autumn, mainly including visiting institute innovation units to understand researchers' intelligence needs and providing information literacy education and training. This year, due to delayed work resumption, corresponding work was also affected. The subject librarian team proactively planned to provide database and tool usage training to researchers and students through online teaching. "Sci-Think" has an excellent foundation for online live broadcasting, having already live-streamed numerous large-scale training sessions, academic conferences, and popular science lectures. This time, the information literacy lecture hall combined commercial online course software with the "Sci-Think" live broadcast platform, ensuring lecture quality while facilitating subject librarians to forward in various WeChat groups and providing

replay options. Moreover, this service was open to the entire public. To date, 10 online live sessions have been conducted through "Sci-Think," with content detailed in Table 2 .

2 "Sci-Think" Emergency Science Communication Service Effectiveness

2.1 Net User Increase Analysis

"Sci-Think" WeChat official account currently has 85,000 online users, primarily researchers and students. Analyzing net user increase numbers (new followers minus unfollows) between January 2020 and February 2020 (see Figure 2 [Figure 2: see original paper]) reveals that February saw significant growth in net user increase, with daily net increase reaching 183 people—nearly a 600% increase compared to January's 26 people per day. This fully demonstrates that the research community had very high attention to information pushed by "Sci-Think" during the pandemic. Analyzing the push content during three peak attention periods in Figure 2 shows they corresponded to electronic resource literature access (February 2, 4, 20), research information literacy lecture hall live broadcasts (February 27, 28, 29), and coronavirus popular science live broadcast (February 23) content.

2.2 Single Content Reading Volume Analysis

Sorting "Sci-Think" WeChat official account single content by reading volume between February 1 and May 15, the top 10 articles by reading volume are detailed in Table 3 . The top three contents were all related to electronic resource guarantee information, with total reading volume reaching 93,000 person-times. This indicates that during the pandemic, researchers working from home had the strongest demand for accessing electronic literature resources, fully demonstrating that literature demand guarantee is the top priority in professional libraries' emergency information services.

Second was information related to the novel coronavirus. During the pandemic, the daily "COVID-19 Scientific Research Dynamic Monitoring Daily Bulletin" content published by "Sci-Think" exceeded 100,000 person-times in total reading volume. This bulletin content, compiled by intelligence professionals with professional backgrounds focusing on key points of research papers, enabled researchers to timely and quickly understand the latest progress in COVID-19 scientific research offensives. The relatively high reading volume demonstrates recognition from scientific personnel for this emergency service of professional libraries.

Notably worth attention is that the live broadcast preview for the fifth session of "CAS Research Information Literacy Lecture Hall: The Correct Way to Open the Literature Management Tool EndNote X9," pushed on March 5, ranked sixth in reading volume among "Sci-Think" published content. WeChat

official account content reading volume has a certain positive correlation with push time—generally, among the same type of content, earlier publication time correlates with higher reading volume. Within the statistical period, this information was published latest yet achieved relatively high reading performance, indicating high user demand for this live broadcast course. EndNote is a literature management software and one of the most commonly used research tools for researchers and students, also being a key training focus for subject librarians during spring institute visits. This live broadcast timing coincided precisely with the period when graduating students were writing their theses, and proficient use of EndNote would greatly save time and effort needed for organizing references. During the Q&A session after the live broadcast, many students indeed asked the instructor questions about modifying reference formats.

Additionally, analyzing the "Sci-Think" live broadcast of "Scientist Forum: Secrets of Viruses" reveals that although this content only had 1,427 reading person-times, the total live broadcast viewership exceeded 12,000 people, likely related to extensive direct forwarding of the live broadcast QR code. From these data, we can see: during the pandemic, the public paid very close attention to popular science content related to the novel coronavirus. The COVID-19 outbreak pushed public attention and discussion about the novel coronavirus to a climax. Under these circumstances, the Library's "Scientist Forum" team actively utilized its expert resource database to disseminate emergency scientific knowledge to the public with an objective and impartial stance, achieving multiplied results with half the effort.

3 Reflections on Professional Libraries' Emergency Information Services

Throughout the long history of library development, its functions and status have continuously expanded and changed, with keeping pace with the times being the eternal theme of library career development. When major natural disasters or public health emergencies occur, libraries should fully leverage their advantages in information resources, technical support, and talent teams to provide characteristic services for various users [5]. Simultaneously, how to timely and rapidly promote and publicize these characteristic services has become an important proposition for libraries' emergency science and culture communication.

In this pandemic, "Sci-Think" conducted preliminary explorations of professional libraries' emergency science communication service models around the Library's pandemic prevention and control support work. Through this process, the authors have gained more thoughts and insights on how professional libraries can better provide new media services for scientific research.

3.1 Strengthen Publicity and Build a User-Oriented Library Emergency Service Communication System

Professional libraries generally serve personnel working and conducting research in specific industries or fields [6]. In the early stage of this public health emergency, researchers encountered significant obstacles in accessing scientific literature, which would seriously affect the normal conduct of research activities. "Sci-Think" received widespread user attention for its promotion of scientific literature access guarantee, precisely demonstrating this point. Therefore, professional libraries' emergency service publicity needs to target user demands, leverage their professional advantages, fully utilize multiple dissemination platforms, and establish a user-oriented professional library emergency service communication system.

3.2 Strengthen Information Selection and Review Mechanisms

In the new media era, abundant information sources and dissemination channels increase the difficulty of information screening. "Sci-Think" positions itself as a research new media platform focusing on publishing research progress and scientific and technological news. During the pandemic, all research progress published by "Sci-Think" consisted of compiled scientific paper information. However, even scientific information faces the need for information screening. The epidemic is a command, and time is life—accelerating scientific research offensives and communication speed is a crucial link in defeating the epidemic. In this pandemic, the advantage of preprint systems in facilitating rapid scientific exchange became more prominent. In the early epidemic stage, many research papers chose to first publish in preprint systems. However, since preprint system papers have not undergone professional peer review, their quality varies compared to research published in mainstream academic journals. When selecting and publishing this information, "Sci-Think" placed greater emphasis on review processes, paying attention to screening and judgment, and strengthening quality control of published content.

3.3 Consolidate Capability-Based Library New Media Emergency Services

In recent years, new media dissemination has become increasingly prominent in expanding library services. Library new media communication services have expanded from traditional service publicity to new knowledge service dissemination levels. Meanwhile, professional library new media communication services feature prominent professionalism and academic characteristics, placing higher demands on new media communication service team capabilities: on one hand, team members need to be familiar with professional knowledge of media communication; on the other hand, team members also need certain disciplinary professional backgrounds and relatively accurate understanding of researchers' needs and pain points. The Library established the "Sci-Think" new media knowledge service team in 2016, with team composition and working mecha-

nisms fully considering these two aspects. While fully cooperating with subject librarian teams, the new media team leverages its professional expertise, taking user needs as the starting point for work, hoping to provide more precise and convenient mobile knowledge services for researchers. During this COVID-19 pandemic, the new media team actively cooperated with various business teams across the center, considering more direct and efficient communication methods, learning new live broadcast software, innovating live broadcast methods, starting with improving the new media team's service capabilities, and continuously supporting professional library emergency services.

3.4 Establish and Improve Emergency Plans and Service Mechanisms

Emergency response plans for public health emergencies can standardize and guide emergency handling work for various public health emergencies, effectively preventing, timely controlling, and maximizing the elimination of hazards caused by emergencies to public health [7]. The occurrence of major public health emergencies is often unpredictable. This pandemic's emergence posed a challenge to emergency management capabilities across all social sectors. Although libraries at all levels have implemented many measures in response to this event, these measures were largely driven by user demands. Emergency plans formulated by libraries domestically and internationally mostly focus on document preservation, fire and flood disasters, and personnel safety, such as the "IFLA Disaster Prevention Manual" [8]. However, for major public health emergencies like SARS and COVID-19, the library profession lacks referable emergency management plans and service mechanisms, nor does it have plans for research new media participation in emergency science communication work. The development of research new media emergency science communication services reflects professional libraries' high sense of social responsibility, concern for users' emergency needs, and innovation in service models and mechanisms. However, it should be recognized that library emergency science communication service development currently remains in the exploratory stage. Therefore, we should effectively establish and improve public health emergency science communication service mechanisms, including complete organizational structures, professional personnel allocation, effective inter-departmental collaboration, scientific process handling, timely effect tracking, in-depth function analysis, and forward-looking improvement feedback, to implement departmental and team work requirements and work systems. Through regular emergency plan drills, we should continuously enhance team members' emergency service capabilities and inter-departmental cooperation, enabling research new media to timely and effectively participate in the entire chain of library emergency services and fully play its role as a publicity window and platform whenever facing public health emergencies.

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Author Contributions

Li Nan: Responsible for writing part of the paper;
Zhang Chao: Provided topic selection, framework, and determined content analysis indicators, wrote part of the paper;
Lu Lu: Responsible for relevant data collection, sorting, and statistics;
Zou Muhong: Responsible for relevant data statistics.

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