An Analysis of Journal Early Warning Systems in World-Class Universities Based on Content Analysis

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Abstract

【Purpose】To address the increasingly severe problem of predatory publishing, draw on the practical experience of journal alert systems in world-class universities, and provide references for improving the current status of China's academic journal alert system and promoting the construction of a research integrity system. 【Method】Through web-based investigation, textual materials on the topic of journal alerts were obtained from the websites of the top 50 universities in the QS World University Rankings 2022, and content analysis was conducted using grounded theory. 【Results】An element model of the journal alert system for world-class universities was constructed, revealing that China's journal alert system is in its initial stage, with deficiencies in journal checking tools, publishing policies, disciplinary services, and other aspects. 【Conclusion】It is necessary to further improve the journal alert system through measures such as promoting academic journal checking tools, guiding authors to focus on publishing rights and interests, strengthening the review and management of research funding, constructing a disciplinary service platform for journal alert topics, and reforming research evaluation methods.

Full Text

An Analysis of Journal Early-Warning Systems in World-Class Universities Based on Content Analysis

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Abstract

Purpose: To address the increasingly severe problem of predatory publishing by drawing on the practical experiences of world-class university journal early-warning systems, and to provide references for improving China's academic journal early-warning system and promoting the construction of a scientific research integrity system.

Methods: Through web-based research, textual materials related to journal early-warning were collected from the websites of the top 50 universities in the QS 2022 World University Rankings, and content analysis was conducted using grounded theory.

Findings: This study constructed an element model of the journal early-warning system in world-class universities, revealing that China's journal early-warning system is still in its initial stages, with deficiencies in journal inspection tools, publishing policies, and disciplinary services.

Conclusions: It is necessary to further improve the journal early-warning system by promoting academic journal inspection tools, guiding authors to pay attention to publishing rights, strengthening the review and management of research funds, constructing disciplinary service platforms on journal early-warning themes, and improving research evaluation methods.

Keywords: Early-warning journals; Content analysis; Open access; Predatory journals

1. Introduction

In recent years, the global open access environment has fostered numerous predatory journals that profit from unreasonable article processing charges while neglecting paper quality and peer review services. These practices not only damage the reputation and rights of contributors but also threaten the overall academic ecosystem [1]. Research on the Chinese Academy of Sciences' Early-Warning Journal List reveals that Chinese scholars account for over 70% of publications in such journals [2], posing a significant threat to China's academic environment. Consequently, establishing and improving journal early-warning systems to strengthen risk prevention and management has become urgent.

In 2018, the General Office of the State Council issued the "Opinions on Further Strengthening the Construction of Scientific Research Integrity" (hereinafter referred to as the "Opinions"), which called for establishing and improving academic journal management and early-warning systems. The document encouraged institutions to develop screening criteria for early-warning journals and supported relevant organizations in publishing domestic and international academic journal early-warning lists [3]. In response, numerous early-warning lists have emerged, including the Chinese Academy of Sciences' International Journal Early-Warning List, which has helped researchers select appropriate publication

platforms and urged publishers to strengthen quality management [4]. Nevertheless, China's academic journal early-warning system remains in its initial exploratory stage, with immature institutional design and practice.

Current research on journal early-warning primarily falls into three categories. First, studies explore machine learning methods for identifying early-warning journals, such as identifying abnormal OA journals based on publication fee characteristics [5], identifying early-warning journals using paper questioning data from PubPeer forums [6], and recognizing abnormal journal behaviors based on submission acceptance rates and author origins [7]. Second, research evaluates and improves existing early-warning tools, such as proposals to modify the 55 criteria used for Beall's List and to transcend the existing "blacklist/whitelist" paradigm through preprints and post-publication peer review for more accurate assessment of fraudulent intentions [8]. Third, studies examine the current state of early-warning system construction, revealing issues such as absent stakeholders, low information transparency, insufficient scientific authority, and imperfect dynamic update mechanisms in China's system [9], while also noting regional differences in response strategies among top-ranked university libraries in the United States, Canada, and Latin America [10].

Overall, existing research has improved early-warning identification methods from multiple perspectives and revealed the construction status of academic journal early-warning systems, providing theoretical and empirical foundations for combating academic misconduct and promoting research integrity. However, current studies primarily focus on list-based early-warning tools, lacking macro-level integration of other information resources within the overall early-warning system, which limits the full utilization of various resources. Universities, particularly research-intensive institutions, are not only key actors in scientific research but also important entities for formulating, disseminating, and implementing early-warning policies [9]. Examining university-published early-warning information can comprehensively reflect how various elements function within the journal early-warning system. Therefore, this study investigates the specific content of journal early-warning practices among the top 50 world-class universities in the QS 2022 rankings, conducts content analysis of relevant textual materials, constructs an element model of world-class university journal early-warning systems, and aims to provide references for improving China's academic journal early-warning system and promoting research integrity construction.

2. Research Design

This study employs web-based research and content analysis methods, using grounded theory for qualitative textual analysis of journal early-warning materials collected from world-class university websites. Grounded theory is one of the most commonly used qualitative research methods in social sciences and has significantly contributed to theoretical development in China's library and information science discipline [11]. Among its three major schools, the three-stage

coding paradigm proposed by Strauss and Corbin divides the coding process into open coding, axial coding, and selective coding [12]. Based on this three-stage procedure, this study coded materials related to journal early-warning systems from the websites of the top 50 universities in the QS 2022 World University Rankings, constructed an element model of world-class university journal early-warning systems after saturation testing, and conducted analysis.

[Figure 1: see original paper] Content Analysis Process Based on Grounded Theory

2.1 Text Selection

This study selected the libraries of 51 universities ranked in the top 50 of the QS 2022 World University Rankings. From November to December 2022, we visited official university and library websites, using search terms including "Predatory Journals," "Fake Journals," "Predatory Publishing," "Journal Analysis," "Journal Choosing," and "Open Access." A total of 149 valid web documents were collected. Table 1 presents information on selected universities and related textual materials.

2.2 Open Coding

The initial coding phase involved conceptualization of the 149 collected documents. Conceptualization refers to extracting concepts from labeled analysis units based on researcher judgment, with results grounded in the semantics of original materials. Grounded theory requires flexibility, allowing any text fragment, sentence, or word to become a coding object. This study focused concept extraction on content closely related to journal early-warning and journal selection, excluding tangential content such as background and significance of open access. The coding process utilized qualitative analysis software Nvivo12 [13], adopting a text-faithful strategy to extract 95 initial concepts from 550 text fragments, which were further refined into 16 initial categories.

2.3 Axial Coding

Based on open coding, the 16 initial categories were further analyzed to explore their connotations and extensions. Through repeated comparison of conceptual relationships, more abstract main categories were identified. This axial coding process classified the 16 basic categories into four main categories representing core elements of the world-class university journal early-warning system: "A1 Early-Warning Tools," "A2 Early-Warning Policies," "A3 Early-Warning Communication," and "A4 Early-Warning Environment." Table 2 details the main categories, basic categories, and basic concepts.

Table 2 Results of Open Coding and Axial Coding

Main Category	Basic Category	Reference Points	Basic Concepts
A1 Early-Warning Tools	A11 Whitelist	31	AJOL African Journals Online; AVSL Vision Science Whitelist; Cabells Journalytics; DOAJ Directory; ERIH PLUS; ICMJE Whitelist; JournalGuide; UGC India University Grants Commission Whitelist; WAME Global Peer-Reviewed Medical Journals; Nursing Journals Directory
	A12 Blacklist	28	Beall's List; Cabell's Blacklist; Kscien's List; Hijacked Journal Checker; Early-Warning Journals
	A13 Metrics	15	Eigenfactor; H-index; JCR; SCImago Journal Rank; Scopus Citation Reports; SNP, SJR rankings; Suspicious indexes; Indexing in reputable databases; Fake impact factors; Impact factor

Main Category	Basic Category	Reference Points	Basic Concepts
	A14 Inspection Tools	23	LUM Journal Checker; Think.Check.Submit; University of Waterloo Journal Evaluation Tool; UC San Diego Journal Evaluation Tool; Open Access Spectrum Evaluation Tool; University of Liège Predatory Journal Checker; Technical University of Munich Checklist
	A15 Rating Lists	9	ABDC Journal Quality List; ABS Journal Quality Guide (AJG); Harzing Journal Quality List
	A16 Journal Recommendations	13	Edanz Journal Selector; FSTA Journal Recommendation Service; JANE Journal Author Name Estimator; Publisher Journal Recommendation Tools

Main Category	Basic Category	Reference Points	Basic Concepts
A2 Early-Warning Policies	A21 Regulations & Agreements	18	CC Licenses; COPE Cases; DMCA Digital Millennium Copyright Act; SPARC Author Addendum; Publication Licenses; FTC Prosecution of Fraudulent Practices; Legal Support for Victims; Domain Name Dispute Regulations
	A22 Funding Restrictions	12	cOAlition S Journal Checker; Sherpa Fact Funding & OA Query Tool; NIH Statements; Restrictions on Public Funding for Fraudulent Services; Funding Agency Journal Restrictions
A3 Early-Warning Communica-tion	A31 Librarian Consultation	21	OA Teams; Liaison Librarians; Predatory Journal Consultation Forms; Library Publishing Support Groups; Subject Librarians; Scholarly Communication Teams

Main Category	Basic Category	Reference Points	Basic Concepts
	A32 Identification Guides	16	Publons Publisher Identification Guide; WAME Predatory Journal Identification Method; Grand Valley State University Journal Quality Metrics; CARL Journal Evaluation Guide; Duke University Journal Quality Metrics
	A33 Communication Platforms	19	SciRev; SPI-Hub; The Quality Open-Access Marker; Retraction Watch; Communication Forums; Humanities Journals Wiki; Scholarly Communication Blogs
	A34 Course Instruction	11	Journal Selection Courses; Workshops; Keynote Speeches

Main Category	Basic Category	Reference Points	Basic Concepts
A4 Early-Warning Environment	A41 Publication Information	27	ASAPbio Preprint Directory; DOI; ISSN; MLA Directory; PubsHub; Sherpa Romeo OA Policy Platform; Transpose Editorial Policy Database; UlrichsWeb; Institutional Catalog Search; Google Search Alerts; Using Reputable Databases to Screen Publishers
	A42 Publication Standards	14	Beall's List Evaluation Criteria; Bohannon Criteria; COPE Guidelines; DOAJ Journal Admission Standards; JPPS Journal Publishing & Practice Standards; OASPA Publication Standards Compliance

Main Category	Basic Category	Reference Points	Basic Concepts
	A43 Evaluation Improvement	8	Altmetrics; DORA San Francisco Declaration on Research Assessment; Post-publication Peer Review
	A44 Organizational Membership	6	COPE Membership; OASPA Membership; STM International Association of Scientific, Technical and Medical Publishers Membership

2.4 Selective Coding

Selective coding systematically analyzed all conceptual categories to identify a core category and construct a theoretical explanatory model based on textual materials [14]. Combining concepts and categories from open and axial coding, and through repeated examination of textual materials, this study constructed the Element Model of World-Class University Journal Early-Warning Systems (see Figure 2 [Figure 2: see original paper]). In this model, Early-Warning Tools (A1) represent concrete solutions that participants in the open access environment can directly use for journal identification. These tools provide instrumental support for Early-Warning Communication (A3) while being regulated in scope and content by Early-Warning Policies (A2). Meanwhile, Early-Warning Policies (A2) and Early-Warning Communication (A3) mutually reinforce each other: policy content ensures the normativity of communication methods, while communication outcomes enhance the timeliness of policy content. Within the entire journal early-warning system, the Early-Warning Environment (A4) serves as a contextual moderator for all other elements at the academic publishing environment level.

2.5 Saturation Testing

Saturation testing in grounded theory verifies whether extracted concepts, categories, and relationships are sufficient. Theoretical saturation must be achieved

before stopping the addition of textual materials. During open coding in this study, no new initial concepts emerged after coding the 120th document, representing over 80% of the total materials. Therefore, the constructed explanatory model is considered theoretically saturated.

[Figure 2: see original paper] Element Model of World-Class University Journal Early-Warning Systems

3. Analysis of Early-Warning System Elements

3.1 Early-Warning Tools

Early-warning tools are journal identification methods developed by researchers and academic organizations based on publication characteristics, designed to help researchers efficiently avoid predatory journals. These tools can be categorized into metric-based, questionnaire-based, and list-based types.

3.1.1 Blacklists Creating blacklists is the most direct method to help contributors and readers avoid predatory publishing traps. Blacklists can be subdivided by creator into personal, academic group, and commercial company types. The most famous personal blacklist is "Beall's List" created by University of Colorado librarian Jeffrey Beall [15], cited by 19 of the 51 surveyed universities. Nanyang Technological University recommends the "Kscien's List" created by scientific research organization Kscien, which inherits and updates content from Beall's List to monitor misconduct by predatory journals and publishers [16]. Five universities including Nanyang Technological University, Cornell University, and University of Michigan recommend Cabells' "Cabell's Predatory Reports" [17], with Johns Hopkins University Library purchasing the product for campus reference.

3.1.2 Whitelists Whitelist tools identify journals or publishers that comply with academic publishing ethics and maintain proper peer review processes and accurate editorial information through expert evaluation or membership applications. The DOAJ Directory [18] is the most widely used whitelist, recommended by 29 universities including Oxford University for screening target journals. Other whitelists focus on specific disciplines, such as the Vision Science Journal Review List by the Vision Science Library Association [19], the European Reference Index for the Humanities (ERIH PLUS) by the European Science Foundation [20], and the Nursing Journals Directory by the International Academy of Nursing Editors [21].

3.1.3 Metrics Bibliometric indicators reflect journal academic influence to some extent. The Impact Factor (IF) is widely used globally, but its manipulability means high scores don't necessarily equal high quality. Some journals on the Chinese Academy of Sciences early-warning list have excellent impact

factors but exhibit non-compliant editorial practices. Therefore, Peking University, Hong Kong University of Science and Technology, University of Toronto, and UC Berkeley caution readers to view impact factors objectively and watch for fake impact factors and suspicious indexes.

3.1.4 Rating Lists Unlike the binary nature of blacklists and whitelists, rating lists score journals across multiple dimensions such as academic influence and publishing practices, providing more nuanced information for journal selection through distinct grades and documented criteria. For example, the University of Sydney recommends the ABDC Journal Quality List created by the Australian Business Deans Council, which uses expert panels to rate business journals from A* to C based on review transparency, impact factors, and other metrics. Unrated journals are considered below minimum quality thresholds, including predatory and illegal journals [22].

3.1.5 Inspection Tools Unlike list-based tools compiled by organizations or individuals, inspection tools require researchers to confirm predatory characteristics based on specific journal publication information. These tools typically present as questionnaires, with "Think.Check.Submit" being the most widely used [23]. McGill University references the University of Waterloo's "Journal Publishing Assessment Checklist" [24], Stanford University and Nanyang Technological University reference Loyola Marymount University's "Journal Evaluation Tool" [25], École Polytechnique Fédérale de Lausanne references the University of Liège's "Compass to Publish" [26], while the Technical University of Munich [27] and UC San Diego [28] recommend their own library-developed journal evaluation checkers.

3.1.6 Journal Recommendations When target journals cannot be identified, recommendation services help match manuscripts with appropriate academic journals based on abstracts and titles. Providers review journal information to exclude non-compliant publications, objectively preventing contact with predatory practices. Beyond large publisher tools like Elsevier Journal Finder and EndNote Manuscript Matcher, collaborative organizations and enterprises also combat unethical publishing. The National University of Singapore, University of Pennsylvania, University of Michigan-Ann Arbor, Johns Hopkins University, and Nanyang Technological University reference JANE (Journal/Author Name Estimator) maintained by the OHDSI initiative, which highlights DOAJ-listed and MEDLINE-indexed journals while warning about predatory publications in PubMed [29]. Additionally, UC Berkeley Library references IFIS's FSTA journal recommendation service, where expert teams evaluate journal quality and 承诺 to exclude journals failing quality standards or suspected of predatory practices [30].

3.2 Early-Warning Policies

Early-warning policies are protocols or regulations designed to protect researchers from predatory publishing and minimize rights infringement, categorized into publication funding restrictions and digital copyright protection policies.

3.2.1 Regulations and Agreements Existing regulations and agreements protect researcher publishing rights and have generated relevant legal cases. Many surveyed universities publicize these to raise awareness about prevention and rights protection. Five universities including Stanford reference the US Federal Trade Commission's case against predatory publisher OMICS Group, which was charged with deceptive practices including fake peer review and misrepresented impact factors [31]. For victims, Cornell University and Hong Kong University of Science and Technology reference COPE cases where researchers successfully withdrew manuscripts from predatory journals for publication in legitimate venues [32]. Additionally, McGill University, Cornell University, and KAIST emphasize that CC Licenses, DMCA, and the Anti-Cybersquatting Consumer Protection Act can support legal action against predatory journals [33]. École Polytechnique Fédérale de Lausanne advises victims to contact university general counsel for legal consultation [34].

3.2.2 Funding Restrictions With the introduction of Plan S, increasing numbers of traditional publishers are transitioning to hybrid and full OA models, making funding crucial for OA publication fees. Many university research fund managers require researchers to select legitimate journals with transparent peer review and fee structures, prioritizing DOAJ-listed and OASPA-member journals. Imperial College London and the University of Manchester recommend the cOAlition S Journal Checker and Sherpa Fact funding information database to help researchers identify eligible journals and prevent public fund waste.

3.3 Early-Warning Communication

Early-warning communication refers to channels through which research institutions and researchers exchange information about journal risks. Researchers communicate through forums and platforms, while institutions disseminate identification guides, offer courses, and provide librarian consultations.

3.3.1 Librarian Consultation University librarians are obligated to provide journal selection consultation for inexperienced researchers. Many world-class universities emphasize contacting librarians to verify journal legitimacy. École Polytechnique Fédérale de Lausanne and the University of Michigan-Ann Arbor have established publishing support groups. Nanyang Technological University, University of Pennsylvania, and University of Edinburgh have scholarly communication teams offering selection advice and predatory publishing identification.

3.3.2 Identification Guides Unlike inspection tools, identification guides compile objective elements for recognizing predatory publishing, requiring strong judgment from users. Their consensus-based indicators facilitate awareness of predatory characteristics among researchers. Most guides are librarian-developed, including the Canadian Association of Research Libraries' Journal Evaluation Guidelines, Duke University's Journal Quality Metrics, Grand Valley State University Library's Journal Quality Metrics, and WAME's Predatory Journal Identification Method.

3.3.3 Communication Platforms Academic publishing platforms are primary venues for journal selection discussions and experience sharing. Existing platforms include forums, blogs, and collaborative databases. Retraction Watch [35] is the most prominent forum in early-warning and misconduct, alongside discipline-specific platforms like Humanities Journals Wiki [36]. Blogs, with lower maintenance costs, are most numerous. Collaborative databases use academic crowdsourcing to score journal website transparency regarding editorial boards, peer review, and workflows, enabling shared publishing information. Notable examples include QOAM (Quality Open Access Market) [37] and SPI-Hub [38], with Cambridge, University of Munich, and Johns Hopkins providing links.

3.3.4 Course Instruction As the main channel for disseminating early-warning knowledge, courses help raise awareness of academic publishing's "dark side." Twelve universities including Yale conduct identification workshops, nine including Cornell host keynote speeches, and Cambridge, UCL, University of Pennsylvania, and Columbia offer academic publishing courses. These cover academic writing, journal identification, and publishing ethics in flexible formats integrated into researchers' daily academic life.

3.4 Early-Warning Environment

The early-warning environment refers to academic groups' efforts to foster healthy publishing environments by standardizing publication information, creating publishing criteria, and encouraging improved research evaluation to indirectly support journal early-warning.

3.4.1 Publication Information Transparent, comprehensive, and credible publication information forms the data foundation for journal identification. Basic information can be categorized by publishing participants: author information, article information, and journal information. At the author level, ORCID makes author identities clearer in OA environments. Since predatory journals often falsify editorial boards, Cornell University advises researchers to create Google Search Alerts to demand removal of their names if falsely listed [39]. At the article level, McGill University and Tsinghua University recommend attention to DOIs and preprint directories. For journal-level information,

numerous platforms exist: UlrichsWeb, Sherpa Romeo, Transpose, MLA Directory, and PubsHub. Nineteen universities including Oxford and Tsinghua provide access to these platforms, which offer detailed publication information to enhance early-warning scientific credibility.

3.4.2 Publication Standards Journal publication standards both regulate publishers and guide researcher submissions. Blacklist and whitelist creation depends on published standards. Since publishing practices may change over time—some unethical journals reform while predatory ones alter methods to hide intentions—standards offer more long-term value than list-based tools. Typical standards include DOAJ Admission Standards (cited by National University of Singapore, Cornell, UC San Diego), COPE Core Practices (University of New South Wales), OASPA Publication Standards (Nanyang Technological University, Johns Hopkins, Northwestern, UCLA), and JPPS Standards (Cornell, University of Toronto).

3.4.3 Evaluation Improvement Research pressure is a primary cause of predatory journal submissions globally. Improving evaluation systems can effectively reduce such submissions. Many world-class universities recommend enhanced evaluation metrics. The National University of Singapore and Chinese University of Hong Kong suggest Altmetrics to understand social media impact. The London School of Economics and other institutions have joined DORA (Declaration on Research Assessment), de-emphasizing impact factors and focusing on research quality. Cambridge acknowledges peer review limitations, noting that "post-publication peer review works better as an alternative quality control" [40].

3.4.4 Organizational Membership Membership in internationally recognized publishing ethics organizations has become a criterion for good publishing conduct. Most surveyed universities recommend selecting COPE and OASPA member publishers. These organizations have admission standards and member conduct regulations. COPE, OASPA, DOAJ, and WAME jointly compiled Principles of Transparency and Best Practice as minimum membership standards [41]. STM (International Association of Scientific, Technical and Medical Publishers) requires members to adhere to ethical principles, clarify peer review status and fee structures, and eliminate reputation-damaging practices [42].

4. Implications for China's Journal Early-Warning System Construction

To validate the model and explore China's current early-warning system construction, we collected textual materials from 39 top Chinese "Double First-Class" universities using the method described in Section 2.1. Analysis based on the constructed model is shown in Figure 3 [Figure 3: see original paper]. After excluding institutions without relevant materials, 24 universities remained.

The figure reflects the construction status of these universities' early-warning systems, with colored cells indicating alignment with corresponding model elements. The analysis reveals that nearly half of top Chinese universities have not implemented early-warning initiatives, while those that have exhibit singular, superficial approaches, confirming that China's academic journal early-warning construction remains in its initial exploratory stage. Based on these findings, we propose the following recommendations.

[Figure 3: see original paper] Evaluation Results of Early-Warning System Elements in Top Chinese Universities

4.1 Promote Academic Journal Inspection Tools

Compared to world-class universities, China's top institutions have not prioritized inspection tools. These tools enable rapid risk assessment based on basic journal information, enhancing researcher sensitivity and cognition when list-based tools are not updated promptly. Many world-class university libraries, such as the University of Munich, actively develop and promote institution-specific inspection tools—a practice worth emulating. Chinese university libraries should develop or adapt widely-used tools like Think.Check.Submit based on thorough understanding of early-warning mechanisms, and evaluate their effectiveness. Inspection tools also offer strong dissemination potential; institutions should promote them through email, flyers, and online questionnaires to expand their reach among researchers.

4.2 Guide Authors to Publishing Rights Through Case Studies

Early-warning policy construction remains relatively weak. World-class universities focus on protecting legal publishing rights, emphasizing legal support for victims and restricting predatory publishers. For example, KAIST guides its community to use DMCA and Anti-Cybersquatting laws to take judicial action against predatory journals [45]. In contrast, China's legal framework lacks infringement recognition for OA publishing, creating risks [43]. Therefore, researchers need deeper understanding of copyright protection regulations, guided by representative international cases to focus on underlying legal logic and strictly prohibit digital copyright infringement based on unethical publishing motives [44].

4.3 Strengthen Research Funding Review and Management

The investigation found that nearly all top Chinese universities have not publicly mentioned funding review and management systems for early-warning journals. Opaque fee structures and unscientific peer review are key characteristics of predatory journals; tolerating submissions to such journals wastes national research funds. The Swiss Federal Institute of Technology warns that "using public funds to pay for fraudulent publishing services violates institutional regulations" [45]. Therefore, research institutions should improve funding review

and management systems, identify unethical pricing strategies, and list predatory journals in funding blacklists to restrict fund abuse. Funding agencies should monitor international early-warning list updates and major retractions to proactively address potential misconduct and minimize losses.

4.4 Enhance Librarian Service Capacity and Effectiveness

World-class universities build early-warning communication on publishing platforms, using identification guides as content and librarian consultation as the means, emphasizing joint participation. Compared to world-class universities, Chinese top institutions perform well in disseminating guides and conducting courses but lack librarian consultation services. Kyoto University Library, for example, created detailed consultation forms for predatory publishing questions, inviting researchers to share publication details for more targeted guidance [46]. Therefore, Chinese university libraries should strengthen librarians' roles in scholarly communication, enhance subject librarians' guidance capabilities on journal identification, and improve proactive service awareness to optimize consultation effectiveness.

4.5 Promote Construction of Subject Service Platforms for Journal Early-Warning

Significant gaps remain between Chinese and world-class universities in constructing subject service platforms for journal early-warning. Chinese university libraries emphasize lecture-based training but lack awareness for building online information resources. LibGuides is the most influential subject navigation tool in international libraries, with nearly half of surveyed world-class universities embedding early-warning themes into LibGuides to integrate background information, identification guides, online courses, and consultation channels. Chinese university libraries should integrate short-term courses and workshops with LibGuides platform construction to enhance digital publishing literacy and strengthen disciplinary service capabilities.

4.6 Improve Evaluation Methods and Foster a Healthy Early-Warning Environment

Constructing a healthy early-warning environment is essential for fostering a sound academic publishing ecosystem [47]. Compared to world-class universities, Chinese top institutions need to better integrate publication information, clarify publishing standards, and improve evaluation methods. The Ministry of Science and Technology's "Measures for Eliminating Unhealthy Paper-Centric Orientation in Sci-Tech Evaluation" advocates representative work systems, creating a favorable environment for world-class Chinese journals [48]. Building on this, China should gradually abandon single impact factor metrics, incorporate compliance with publishing standards into evaluation systems, combine quantitative and qualitative methods, integrate metrics with peer review, and emphasize post-publication peer review quality to build a diversified early-warning

environment [49]. Evaluation improvement should target both research output and publishing behavior, establishing comprehensive journal information platforms to support journal selection and dynamic early-warning list updates.

5. Conclusion

This study examined early-warning information published by top 50 QS 2022 world-class universities, constructed an element model comprising early-warning tools, policies, communication, and environment, and analyzed China's system construction status. The findings reveal that China's journal early-warning system started relatively late, with significant gaps compared to world-class universities. China should develop early-warning tools and communication platforms, build policies aligned with international publishing trends, and create a scientific early-warning environment based on its academic publishing characteristics. This study's limitation lies in its single-source data collection from universities, which may not fully reflect overall system construction levels. Future research should include institutions with high misconduct rates, such as hospitals, to provide more targeted solutions.

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