A Mobile Online Journal Platform Based on WeChat Mini Program and Streaming Media Technology: Operational Practice (Postprint)

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Abstract

With the rapid development of mobile devices, the number of mobile users far exceeds that of web users. Constructing mobile journal platforms for scientific periodicals holds significant practical importance for continuously enhancing their dissemination power and influence. This article analyzes the current application status of WeChat Mini Programs and streaming media technology in scientific journals, and introduces a mobile journal platform based on these technologies, its functionalities, and operational practices, using *Railway Computer Application* as a case study. The platform' s trial operation results demonstrate that it has improved readers' reading experience, facilitated interactive communication among editors, authors, and readers, and further strengthened user engagement.

Full Text

Mobile Journal Platform Based on WeChat Mini-Programs and Streaming Media Technology: Development and Operational Practice

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Abstract: With the rapid development of mobile devices, the number of mobile users far exceeds that of web users. Building a mobile journal platform for scientific journals holds significant practical importance for continuously enhancing their dissemination power and influence. This paper analyzes the current application status of WeChat mini-programs and streaming media technology in scientific journals. Using *Railway Computer Application* as a case study, it introduces a mobile journal platform based on WeChat mini-programs and

streaming media technology, detailing its functions and operational practices. The platform' s trial operation results demonstrate that it improves readers' reading experience, facilitates interaction between editors, authors, and readers, and further strengthens user engagement.

Keywords: mobile journal platform; mobile devices; platform functions; WeChat mini-program; streaming media technology

Introduction

The proliferation of mobile devices has created a user base far larger on mobile terminals than on traditional web platforms. Constructing mobile journal platforms for scientific journals, leveraging emerging technologies to disseminate scientific achievements and cutting-edge technologies through computers, smartphones, iPads, and other terminal devices, and establishing real-time interactive bridges between editors, authors, and readers represent crucial practical steps for enhancing the dissemination power and influence of scientific journals.

Current mobile devices offer advantages in speed, convenience, and fragmented reading. WeChat, as a widely used mobile application, demonstrates effective new media dissemination capabilities. Many scientific journals have already launched WeChat official accounts to strengthen content dissemination. WeChat mini-programs, officially launched on January 9, 2017, have found extensive applications in commercial marketing, cultural and sports services, and various social activities. According to the "2021 Mini-Program Internet Development White Paper" published by the Aldzs Research Institute on January 17, 2022, the number of WeChat mini-programs has exceeded 3 million, with daily usage frequency increasing by 32% year-over-year. For mobile journal platforms, WeChat mini-programs essentially function as mobile applications.

Scholars have researched the application of mini-programs in academic journals. Li Guangxin [1] explored user-platform and user-user communication characteristics within the mini-program ecosystem, proposing development strategies for precise services and "pragmatic utilization." Zhou Wei [3] argued that developing mini-programs for academic journals enhances the dissemination and promotion of academic content while expanding application functions beyond existing WeChat official accounts. Fan Jingjing [4] identified key functions for journal mini-programs, including news distribution, promotional services, special issue calls for papers, and user surveys to improve user experience and expand journal influence. Kong Wenjing [5] proposed development strategies for academic journal mini-programs based on current implementation status. Wang Quanli et al. [6] analyzed challenges in integrating academic journals with mini-programs, suggesting pathways for developing media mechanism thinking and connecting multi-party communication channels. Wang Xiaoyan et al. [7-8] examined the impact of streaming media technology on scientific journal publishing, highlighting its advantages in timely research dissemination, increased supplementary in-

formation, and facilitating discussions on research hotspots among editors and authors, while recommending that editorial departments cultivate versatile talent and leverage streaming media for precise research achievement push. Liu Jianchao [9] discussed mini-program applications in academic journals from a user-centric perspective.

Building upon these studies, this paper developed a mobile journal platform for *Railway Computer Application* based on WeChat mini-programs and streaming media technology. The platform enables mobile-based browsing and editorial, review, and publishing functions, making *Railway Computer Application* easily accessible and disseminable within WeChat while providing an excellent user experience.

1.1 WeChat Mini-Programs

WeChat mini-programs operate on the WeChat platform as a new open capability that embodies the concept of "within reach" and "use and go." By associating with official accounts, mini-programs achieve functional complementarity, creating more personalized mobile platforms. Users can access applications by scanning QR codes or searching, eliminating installation and uninstallation concerns while avoiding the slow, laggy experience of browsing web pages within WeChat. Mini-programs provide a near-native app experience with fast loading and smooth usage.

Railway Computer Application has already implemented a web-based journal platform with editorial and publishing functions, accumulating development experience and a stable fan base through its smoothly operating WeChat official account [10]. This foundation supports the implementation of the mobile journal platform based on mini-programs and streaming media technology.

1.2 Streaming Media Technology

Streaming media technology presents content through an on-demand data "stream" approach, enabling integrated display of text, images, audio, and video. Compared to traditional digital reading, it offers mobile terminal adaptive reading with advantages in real-time transmission and clear video information. Journal streaming media technology primarily serves digital reading, retrieval, and query services. Currently, journal content digital reading mainly adopts streaming media full-text presentation, as illustrated in Figure 1 [Figure 1: see original paper] [11].

RichHTML, as a new publishing model, adds data parsing and production processes to traditional publishing. Through structural processing of full texts, it achieves rich media publishing, making publications more flexible and diversified to meet readers' increasingly personalized needs. The mobile journal platform employs RichHTML technology to perform structured processing—including content analysis and knowledge indexing—on published articles, creating structured

XML files and presenting them as static HTML pages on WeChat mini-programs [12].

2. Mobile Journal Platform Functions

Based on WeChat mini-programs and streaming media technology, the platform provides services for readers, authors, and editors, enabling mobile operation of traditional web-based journal platform functions. The functional architecture is shown in Figure 2 [Figure 2: see original paper].

2.1 Reader Platform

2.1.1 Journal Reading The platform enables customized display by year, issue, and column, with categorized presentation of past and current issues. The main page displays covers of published issues for the current year. Readers can select an issue to view its table of contents, then choose an article to read its abstract and keywords. Clicking the "Read Full Text" button at the bottom allows full-text reading. Readers can also bookmark articles for later access.

2.1.2 Journal Subscription In the subscription module, readers can submit personal information including name, occupation, contact details, mailing address, desired issue numbers, and quantities. This information is pushed in real-time to subscription managers who can subsequently communicate with readers to complete subscription services.

2.1.3 Digital Publishing Each published issue' s scientific papers are adaptively presented in streaming media format on readers' mobile devices, enabling anytime, anywhere viewing.

2.1.4 Information Services The platform synchronously publishes various information from the journal' s official account, including call for papers notices, industry-related popular science knowledge, interpretations of outstanding papers, and conference report summaries.

2.2 Author Platform

2.2.1 Author Information Management Authors can query, input, and modify personal information including title, name, gender, email, research interests, professional title, education, mobile number, ID number, and mailing address.

2.2.2 Manuscript Status Inquiry Authors can check the status of their submissions, including received, initial review, external review, revision requested, rejection, fee payment, acceptance, layout, and publication. Detailed workflow information is also available. With notifications enabled, authors receive alerts when manuscript status changes.

2.2.3 Online Submission Authors can submit manuscripts through the platform by uploading papers and completing relevant information including originality confirmation, submission guidelines, publication agreement, title, author information, abstract, keywords, funding information, recommended reviewers, and messages to the editorial office.

2.3 Editor Platform

2.3.1 Manuscript Status Editing Editors can modify manuscript status through categories including received, initial review, external review, revision requested, rejection, acceptance, layout, and publication.

2.3.2 Review Comments During initial review, editors can input revision suggestions for manuscripts, enabling authors to view comments directly on mobile devices.

2.4 Interface Management

2.4.1 Editorial System Interface This module enables data exchange between the mobile mini-program and web-based journal platform for authors and editorial content.

2.4.2 WeChat Official Account Interface This module facilitates data exchange for information publishing between the mini-program and WeChat official account.

2.5 User Permission Management

System administrators manage permissions for readers, authors, editors, and other user categories.

2.5.1 Administrators Administrators handle platform maintenance, user permission settings, and data backup.

2.5.2 Authors Functions include author information management, manuscript status inquiry, and online submission, enabling convenient mobile registration, uploading, and real-time status tracking.

2.5.3 Readers Functions include journal management, subscription, digital publishing, and information services, allowing convenient mobile subscription, article access, and bookmark management.

2.5.4 Editors Functions include manuscript status editing and review comments, enabling convenient mobile manuscript review and status updates.

2.6 System Management

System administrators manage backend environment configuration, network settings, journal basic information, and operational processes through this module.

3. Implementation and Operational Practice

3.1 Realizing Mobile Journal Functions

Through WeChat mini-programs and streaming media technology, the platform migrates *Railway Computer Application* web functions to mobile, enabling journal reading, news viewing, and manuscript querying. The mini-program interface is shown in Figure 3 [Figure 3: see original paper].

The homepage includes six modules: user information, scrolling news, operation bar, recommended reading, and FAQs. The user information module displays account details; clicking the avatar opens a personal information page for accessing author or editor platforms. The scrolling news module displays latest journal updates with detailed views available on click. The operation bar provides access to common functions including paper search, online submission, author inquiry, and journal subscription. The journal reading module displays covers of the latest issues; clicking a cover opens the table of contents. The recommended reading module links to hot content from the journal' s official account. The FAQs module addresses common editorial office questions.

3.2 Strengthening Integration with Official Accounts

Binding the mobile journal platform with the journal' s official account through the mini-program combines personalized mini-program features with official account messaging capabilities, strengthening interaction between the journal and its authors and readers. When users log into the platform via the mini-program, the backend can request WeChat account authorization to associate platform accounts with WeChat accounts, enabling access to submission information. The editorial office can then send timely updates through the official account and facilitate real-time communication. Using the official account' s push notification function combined with data analysis of authors' research fields and paper keywords enables targeted, precise push of paper recommendations and call for papers, maximizing authors' submission potential.

3.3 Enhancing Journal Business Capabilities

Railway Computer Application traditionally offered annual subscriptions primarily through telephone and post office channels, which proved inconvenient for individual readers. The mini-program' s payment functionality streamlines subscription processes. Readers can conveniently complete annual subscriptions online and, based on personal interests, subscribe to specific issues or special themed collections such as "Intelligent Railways," "Intelligent Construction," or "Network Security," enabling "unbundled" sales. Online subscription through

the mini-program not only facilitates reader access and increases subscription volume but also expands the journal' s dissemination power, representing a welcome initiative for editorial offices, authors, and readers alike.

The *Railway Computer Application* mobile journal platform based on WeChat mini-programs and streaming media technology has launched trial operations. Leveraging mini-programs' lightweight, installation-free characteristics, the platform provides a more convenient mobile experience for editors, authors, and readers. Streaming media technology improves traditional reading presentation, enabling seamless, fluid reading experiences. Integration with the existing official account facilitates timely submission status notifications, precise content recommendations, and closer connections between editors, authors, and readers, thereby strengthening user engagement and enhancing the journal' s influence and dissemination power.

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