Editing Practice

Application development method of sci-tech journals based on cloud platforms: Taking Changbai Mountain Academic Exchange as an example

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ABSTRACT

Background: To provide an autonomous and rapid application (App) development method for science and technology (sci-tech) journals. **Methods:** As an example, the selection basis and technical requirements of the App cloud platform are given, and the development process of the sci-tech journal App based on the cloud platform is introduced in detail. **Result:** Based on the cloud platform, mobile Apps can be developed quickly without writing programs. **Conclusion:** The App cloud platform can break through the technical bottleneck of App development of sci-tech journals and provide a new way for the integration of sci-tech journals and new media.

Key words: science and technology journal, application cloud platform, application development, media convergence

As a representative of new media in the network era, the construction level and influence of Weibo, WeChat, and mobile clients characterize the degree of integration of traditional media and new media. At present, the influence of Weibo, which emerged first, is weakening while the latecomer, the WeChat public platform, is flourishing. The mobile presence of mass media is booming while there are few mobile access points for academic media, especially science and technology (sci-tech) journals. The development of mobile applications (Apps), which constitute the three pillars of the mobile Internet era along with network and mobile terminal equipment, has been exponential. By the end of 2016, the number of Apps in China reached 17 million.[1] However, the number of sci-tech journal Apps is extremely small.

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Since opening an official WeChat account is fast and convenient and such accounts meet basic communication needs, some find it unnecessary to develop an App. It is clear that compared with applying for an official WeChat account, one may encounter many technical problems while developing an App. Moreover, maintenance is relatively complicated and tedious, and the installation of the App requires a certain amount of mobile phone space. However, the advantages of Apps are also obvious. For example, Apps present more autonomy, strong function expansibility, accurate push, and high user loyalty. This format is thus suitable for sci-tech journals, which contain professional content and require in-depth reading. Furthermore, developers have large authority and strong independence, the App development system is safe and stable, the degree of dependence on the network is low, and the reading experience is better. The "Internet +" environment and media convergence are forcing sci-tech journals to innovate on their knowledge service methods[2,3] and explore development paths that conform to the era of media "integration". Although the media integration of sci-tech journals has been discussed in the literature,[4–6] few studies have been conducted on the development of sci-tech journal Apps.[7–9] Such studies have mainly presented theoretical research about different types of Apps (platform, integrated, and single type)[10,11] in different fields,[12–14] as well as technical reports on the development of technology journal

Apps, using cloud platforms for the production and publication of mobile reading works[15] like Application Star[16] and AppBook.[17] According to the results of such research, most existing sci-tech journal Apps are developed independently or commissioned by a third-party organization[18] at a relatively high cost. Few studies have used mature and large-scale commercial cloud platforms to develop sci-tech journal Apps, and no literature has been retrieved on Apps that are actually online. From the perspective of technology alone, most of China's sci-tech journals generally lack staff who can master new media technologies and flexibly use network platforms to develop journal Apps. However, it is not financially realistic to entrust third-party organizations to develop Apps or introduce specialized developers. Therefore, under the premise of limited funds and talents, it is both economical and practical to use the easier-to-use App cloud platform to develop mobile Apps for sci-tech journals, which can greatly reduce the threshold for App development. Therefore, the author provides the basis for the selection and development environment of the mobile App development platform and introduces the development process in detail using the self-developed Changbai Mountain Academic Exchange sci-tech journal App to provide technical references and content references for many sci-tech journal publishers, which have no strong technical strength, help them get rid of technical constraints and develop Apps independently and quickly, and provide a new method for the integration of sci-tech journals and new media. The App development method provided is easy to learn, with strong practicality, and can be used quickly even without a technical foundation. The content design is close to the reality of scientific and technological journals, the demonstration effect is strong, and it is easy to copy and reuse.

THE SELECTION OF THE APPLICATION CLOUD PLATFORM

The development of Apps through App cloud platforms is easy, as some even require little to no programming. Popular App development platforms in foreign countries include Knack, Codiqa, Tiggzi, Conduit, and Keen.io. In recent years, a large number of development platforms have emerged in China, among which the more widely used are Jianwang App Factory, Appbyme, AppCan, Application Genie, Application Park, Dingdang, Application Star, Duxin Magic Box, and Sohu Kuaizhan. In addition, there are many similar development platforms at different scales. Different App cloud platforms require different technologies and costs. Sci-tech journals can choose a suitable development platform according to their own technical level, budget, and needs.

Development mode
Since most sci-tech journals are small in scale and weak in strength, they should strive to save costs and facilitate maintenance in App development instead of seeking large and complete journals. Currently, there are three types of App development methods. (1) Entrusting a third party to develop the App using a programming language. This development mode is characterized by strong autonomy, on-demand programming, flexible website structure, a long development cycle, high requirements for developers' professional skills, and large capital investment. (2) Use App development tools or development platforms for partial programming and development. This development mode is characterized by partial autonomy and relatively flexible architecture, but it requires partial code writing, less capital investment, and a shorter development cycle. (3) Non-programming development using an App development platform. This development mode can realize zero-base development without writing code, and an App can be generated with one click. Most cloud platforms have their own databases, which can promote agents, encapsulate codes, provide various functional controls, modular operation, friendly and intuitive interface, short development time, zero investment (mostly advertising), and a relatively fixed website structure; however, the stability is limited by the website.

Technical requirements
Browser
At present, most App cloud platforms are based on the 5th generation hypertext markup language (HTML5) standard, so some browsers do not support them. For example, traditional Internet Explorer (IE) 8 and older browsers cannot fully support the platform built per the HTML5 standard. The platform usually has recommendations for which browser to use, and the choice must be made carefully. Commonly used browsers that support HTML5 including Sogou, 360 Speed Version, Cheetah, Ao Game, QQ, Google (Chrome), Apple (Safari), Firefox (Firefox), IE 9 and above, and Opera.

Applicability
Many App cloud platforms are homogeneous and present similar functions. Therefore, there is no need to choose the best platform, and no platform is the best, as long as it meets one's needs and can be controlled from a technical point of view. It is not necessary that it is free, and small fees may be necessary when there are special needs.

Limitations
Most platforms claim that they can develop Apps for iOS, Android, Windows Phone, Symbian, and other mainstream mobile phone operating systems. However,

there are still some limitations, especially for the iOS system. For example, some platforms require iOS version 8.0 and above and must be "prison break", which means the system cannot be installed on some iPhones. In addition, different platforms allow different frequencies of pushes, which is related to the level of authentication.

Sci-tech journal Apps are mainly created for publicity, and the content that is pushed is mainly published papers. The system structure is not complicated. At the same time, most sci-tech journals lack professional network technicians and development funds. Therefore, it is recommended to use the free (or partially free) App cloud platform without programming for development. To expand the functions in the future, one can apply for an upgrade. After many attempts and comparisons, the editorial department of the *Journal of Beihua University (Natural Science)* chose Sohu Kuaizhan App as the development platform for Changbai Mountain Academic Exchange, the mobile App of the sci-tech journal.

Sohu Kuaizhan Application cloud platform

The Sohu Kuaizhan App platform is a one-stop mobile website cloud platform developed using HTML5, a new communication mode.[19] The HTML5 design and development platform can support cross-platform use and achieve the goal that "once designed, (Apps are) universally applicable".[20] In addition, Apps developed based on HTML5 take less time to start up and have a faster Internet connection. The Sohu Kuaizhan App platform adopts the "building block" construction method with a low threshold. It can realize rapid visual site construction through a drag-and-drop system and generate an App with one click.[21] It is compatible with personal computer (PC), Android, and iOS data operating systems and can manage Apps anytime and anywhere; it has a powerful content management system (article functional modules), abundant third party plug-ins, and accurate marketing promotion channels.[22]

MATERIAL PREPARATION FOR THE APPLICATION

Materials for the website

Website pictures include logo pictures, home pictures, launch pictures, guide pictures, and icons. It should be noted that different platforms have different requirements for picture formats and sizes. Some pictures need to be created using professional software, such as the use of Legu Cheerleading software to make logos. The Sohu Kuaizhan requires that images are at least 640 pixels wide, in Joint Photographic Experts Group (JPEG), JPG, Portable Network Graphics (PNG), or Graphics Interchange Format (GIF) formats,

and no larger than 4 MByte in size. Multiple images can be uploaded simultaneously. Basic texts include App introduction, journal introduction, and column description.

Materials for push contents

The content that can be pushed by the Sohu Kuaizhan App platform includes papers, academic trends, and editing and publishing information. The chosen text must be edited. If it is pushed in both text and pictures, pictures need to be prepared for the paper. Pictures can be those in the paper or related to the content of the paper. According to the need for enhanced publication, authors can also be asked to provide more information related to the paper, such as more complete and detailed data, pictures, and other process materials.

Certification materials

The Sohu Kuaizhan presents three types of certifications: individual, enterprise, and organization. Among them, individual authentication requires the preparation of photos of the front and back of the identity document (ID) card held by the individual. For enterprise authentication and organization authentication, the following materials are needed: A photo of the ID card held by the contact person, photos of the front and back of the ID card of the contact person, photos of the front and back of the ID card of the corporate person, a scanned copy of the business license (enterprise), or a scanned copy of the organization code certificate (organization).

DEVELOPMENT PROCESS

The development environment is the website of the Sohu App development cloud platform at www.kuaizhan.com, supporting Maxthon, 360 Speed edition, Chrome, Cheetah, Sogou, and other browsers.

The development process includes registration, login, template selection, page making, site publishing, site authentication, binding domain name, and App generation and promotion.

Construction of the site

This study introduces the development process of the Changbai Mountain Academic Exchange sci-tech journal App developed by the editorial department of the *Journal of Beihua University (Natural Science)*.

Selection of the template

Sohu Kuaizhan platform provides four types of templates: site, poster, community, and e-commerce. According to the industry, this can be divided into 18 different types of templates, such as e-commerce, life service, education and training, enterprise portal,

cultural communication, information technology, business trade, medical and health, and catering and food. Each type provides many classic case templates free for users. Changbai Mountain Academic Exchange uses the blank template.

Basic settings
Select "Site Setting" in the function selection area of the page creation interface and fill in the basic information through the dialog box, including name, domain name, homepage content (site, poster, e-commerce, and quick message), logo, and head style of the site (theme color of the site).

Creating a page
First, the concepts of the pages and components should be clarified. Each screen presented on a mobile phone or other mobile terminal is a page, which is the basic unit of an App. If the App is conceived of as a book, the page is one page. Components are the basic building blocks of a page. Each component has different properties and functions. There are four types of components: content, layout, marketing, and third party, each of which includes various sub-components. For example, content components include text, images, links, group images, galleries, videos, buttons, titles, article lists, navigation, comments, community lists, forms, HTML, and JavaScript (JS) components. Most components can be dragged directly into the page and set in the property-editing area on the right. Some components need to go into the corresponding backstage to complete specific editing and setting, such as article lists, community list components, and plug-in system components. It can be understood as follows: the so-called website construction involves the use of different components and plug-ins to build pages, and then many pages through links organically organized into a website. Therefore, the main task of developing an App involves building pages and links.

To create a page, the type of content that the page will display first needs to be designed, then the corresponding components (blocks) must be dragged onto the artboard. One should then click the component, set the content and style of the component on the right side of the artboard, and edit the page in the upper toolbar to complete the "installation" of a component. This operation is repeated until all the components of the page are installed and saved to complete the production of a page. The home page of the Changbai Mountain Academic Exchange App has 8 components in total: 2 picture components, 2 text components, 2 navigation components, 1 article list component, and 1 search component. Among them, the two-dimensional code picture and the text "click install or scan code!" link the fixed uniform resource locator (URL) for App download. The three navigation options in the column navigation component— "Development·Utilization", "Resources·Environment", and "Editor·Scholars" are linked to the corresponding columns, respectively. As the content displays part of the article list component through the attribute setting of sorting, display number, publication time, and other contents, the search component is set to a site-wide search. The content and style of the properties can be set for different components.

Quickly add articles
Displaying paper content and academic dynamic information is the main function of the Apps of sci-tech journals. Using this feature, articles can be added quickly by using the article management function on the platform, that is, to establish columns corresponding to different types of articles and then distribute the articles to be pushed to different columns one by one. According to the degree of importance, different article weights determine the order of display. The Changbai Mountain Academic Exchange has three columns. Articles of different types were divided into corresponding columns and displayed on mobile phones according to the column classification. The specific operation process involves selecting "Article Management" in the function selection area and opening "New Article" to enter the article editing interface. The editing interface is similar to that of other word-processing software, with intuitive functions, convenient operation, and instant display effects. At the same time, it provides a header, bottom, title, and other styles and can be used quickly, shortening editing time. Illustrations, components, links, audio, and video can be added to articles so that the display form is rich and flexible, which can supplement content that is difficult to display in the traditional paper editions of scientific and technological journals.

Site publishing and authentication
Only published sites can be read by others. Click "Publish Site" to go to the publish site page, enter the domain name, select the industry and region to which you belong, select the agreement, and click "Publish". The domain name must be the same as the domain name set in the "Site Settings" (CBSXSH).

The trial period for creating the site was ten days. Within this period, the site did not need to be authenticated. Before the trial period ends, sites that do not pass the authentication are taken offline and can only be used after the site is authenticated. In addition, domain names can be bound so that the App can have an independent domain name. However, it is not necessary to bind domain names to small sci-tech journal Apps.

Application generation and promotion
The completed "Page" collection must generate an

App before it can truly become an App, and users can install the App by scanning the quick response (QR) code or visiting the site. Select "Generate App" in the function selection area and click "Generate App" to enter the App generation interface. When generating the App, one needs to submit the App name, upload the icon, startup image, boot image, and determine the version number. Among them, the name refers to the App name (Changbai Mountain Academic Exchange), not the domain name (CBSXSH); the icon refers to the outer package picture of the App, that is, the picture that will appear on mobile devices. The icon of the Changbai Mountain Academic Exchange is a self-designed PNG icon. The startup image refers to the cover image of the App, that is, the first image users see after opening the App. It is recommended to choose a high-definition and concise PNG image. The bootstrap diagram was optional and refers to the diagram that appears before users enter the home page after startup, which can be used to publicize and display the content and features of the App. The version number consists of three digits, with the highest being 10.10.10. When the version is upgraded, the platform reminds users to update the App.

The App can be listed on the Xiaomi App Store, the Huawei App Market, and the Apple AppStore. The Sohu Kuaizhan platform has detailed operation instructions, but some App markets require the webmaster to be certified as an enterprise developer account to be listed.

Management and maintenance

The system will regularly send reports to the specified mailbox, and the number of visitors can also be checked through the website at any time. In addition to PC management and maintenance, the Sohu Kuaizhan App can be downloaded for mobile maintenance. Updates are available as soon as they have been published. Changbai Mountain Academic Exchange has also opened a "Free Speech" function that allows readers to make comments after registering as users with their mobile phones.

SUMMARY

The content available through the Changbai Mountain Academic Exchange App is not a single collection of journals in print content. It is composed of research papers on Changbai Mountain from four journals: the *Journal of Beihua University (Natural Science)*, the *Journal of Jilin Agricultural University*, the *Agricultural Science Journal of Yanbian University*, and the *Journal of Tonghua Normal University*, but it does not include papers that are not related to Changbai Mountain. The aim is to make the App more professional. In addition, the push content includes peripheral information, such as that concerning journal publication and submission. However, the integration of push content is not ideal, with insufficient

depth and limited expansion. It should thus be further strengthened, especially regarding publishing, which should be supplemented with richer content.

For Apps that present a single journal or a small number of journals, the free resources of the App development platform or services with a small amount of investment can fully meet users' needs, but a gap remains between them and the goal of forming a brand with greater influence. Therefore, the feasibility of joint development, cooperative development, and outsourcing development is discussed. In addition, with the development of digital and network publishing, the demand for talent is also increasing. Sci-tech journals should consciously cultivate and introduce professional talent in this field to provide intellectual support for its development.

This study only examines a basic App development process based on the Sohu Kuaizhan, considering text, pictures, navigation, and a few other components. This study only covers a small portion of the rich components and flexible technical means of cloud platforms. Therefore, in future iterations and upgrades of the App, various components and development skills can be more fully applied to enrich the display mode, enhance user-friendliness, and improve user-stickiness.

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Author contributions

Guo W: Conceptualization, Writing—Original draft preparation, Writing—Reviewing and Editing, Software, Investigation, Resources, Methodology.

Conflict of interest

The author declares no conflict of interest.

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