Best Practice of the DAISY Standard in Korea – LG Sangnam Library's Service for the Print Disabled

Hye-Yeon Hann
Planning & Operations Team, LG Sangnam Library, Seoul, Korea.
E-mail address: henahan@lg.or.kr

Yoon-Seok Jeong
Executive Office, LG Foundation, Seoul, Korea.
E-mail address: ysj@lg.or.kr

Won-Hong Jang
Planning & Operations Team, LG Sangnam Library, Seoul, Korea.
 E-mail address: wonhong@lg.or.kr

Abstract:

This paper presents LG Sangnam Library's service for the print disabled as a best practice in implementing the DAISY Standard in Korea. DAISY (Digital Accessible Information System) is a technical standard for digital alternative materials for the print disabled. In order to develop a DAISY-compatible library service, the library not only has developed its collection but also has been actively involved in building technological infrastructure, including mobile devices, DAISY players, and mobile TTS (Text-to-Speech). LG Sangnam Library began a DAISY Digital Talking Book library service (LG DTB Service) with feature phones specifically designed for the print disabled in 2006. It was the world's first ubiquitous library service for the print disabled and also the first online DAISY service in Korea. The Library has consistently developed DAISY technological infrastructure in the way of DAISY technology optimization for the Korean language and by utilizing worldwide open sources. Now the service is one of the most popular DAISY services in Korea. As a future-oriented library, the library has sought innovations in library service for the print disabled. At present, the library is preparing for a new DAISY service unit - a global DAISY smartphone service. This paper introduces LG Sangnam Library's DAISY service generally, and examines the unique features of its DAISY practices, paying particular attention to its innovative mobile service.

Keywords: DAISY, Digital Talking Book, LG Sangnam Library, the print disabled, mobile library service.

1 INTRODUCTION

DAISY (Digital Accessible Information SYstem) is a technical standard for digital alternative materials for the print disabled. Its XML-structured format provides easy and efficient navigation within digital materials. DAISY is also an international open standard so that libraries are able to utilize the standard and its related technologies to their advantage for use with digital content, which has caused DAISY to be adopted world-wide.

Nevertheless, DAISY technologies and related content have not spread widely in Korea. Only three libraries among all the libraries in Korea own collections of more than 5,000 DAISY-formed books (DAISY digital talking books) at present. One of the barriers for the spreading of DAISY in Korea is the uniqueness of the Korean characters. Because of this uniqueness, DAISY technologies, devices and content for other languages could not be used in Korea, which results in missed chances for Korean libraries to utilize open source tools or devices for DAISY. Most special libraries for the print disabled in Korea do not have enough resources or expertise to develop the technological infrastructure for DAISY.

LG Sangnam Library took notice of the benefits of the DAISY standard early in Korea, and adopted it proactively. As a result, the library has given the print disabled a myriad of possibilities to read books, use information and learn knowledge in Korea, a knowledge intensive society. This paper will illustrate the innovative path of a DAISY library service as applied by LG Sangnam Library.

2 INTRODUCTION OF THE LG DIGITAL TALKING BOOK SERVICE

LG Sangnam Library was founded for the public good in April 1996, as the first digital library in South Korea. By exploiting digital technologies, LG Sangnam Library has offered new technologically-grounded services and has proposed a prototype of a Korean digital library. To take on the additional critical role, the library launched a new service, the LG Digital Talking Book Service (LG DTB Service) in 2006. The library has developed the service to play a more value-added proactive role minimizing information disparity in Korea. The LG DTB Service, designed for the print disabled including primarily the blind and the visually impaired, provides access to rich content with voice-support technologies. By actively adopting telecommunication technologies, the LG DTB Service is recorded as the world's first ubiquitous library service for the print disabled, and as the first on-line DAISY library service in Korea.

The goal of the service is to improve their quality of life by enabling the print disabled to read or listen to books anytime, anywhere. In order to accomplish this goal, LG Sangnam Library provides the talking book service not only on the Web but also via the mobile network by embedding voice-support technologies, including voice recognition, voice synthesis, and a voice guide into the both service systems. In terms of the content format, usability was taken into consideration, and the DAISY standard was adopted as a form of talking books because of its structural benefits, including navigation and bookmark functions.

Figure 1. The Service Model of the LG DTB Service

One of the most innovative approaches in the LG DTB Service is the development of mobile phones specially designed for the print disabled. At an early stage, the library noted that a mobile phone was the most appropriate device for the print disabled to share information because it was able to be connected to a wireless network anytime, anywhere, with its handy and portable features. In 2006, the feature phones that the print disabled used, however, had no voice support for them while more than 80 percent of the print disabled used feature phones compared with about 30 percent usage of PCs by them in Korea. In partnership with LG Electronics, LG Sangnam Library developed the 'LG Talking Book Phone,' a feature phone which was specialized for the print disabled and distributed to them for free. The phone was embedded with a TTS (Text to Speech) engine and a mobile DAISY player, which enabled the phone to provide a voice guide for every menu or function available on the phone and to read talking books. Since 2006, LG Sangnam Library and LG Electronics have developed a new model of the LG Talking Book Phone every year, and have distributed 2,000 handsets of the phone annually to the print disabled for free. The LG Talking Book Phone, the world's first phone for the print disabled, has opened a totally new horizon for the print disabled to consume information actively in their daily life.
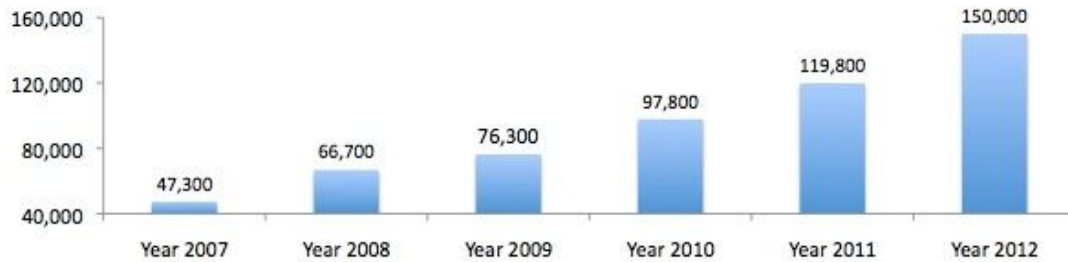
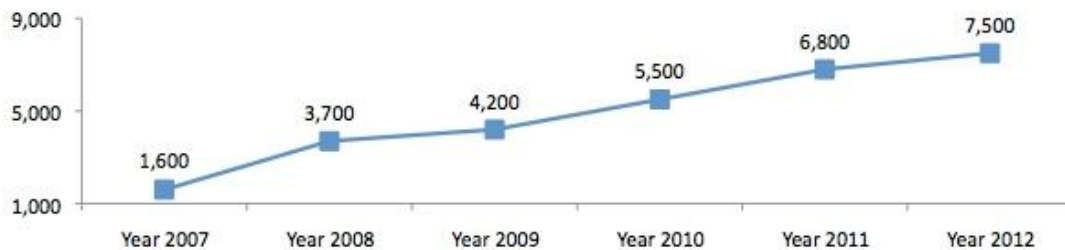**Figure 2.** Annual Usage of Digital Talking Books in the LG DTB Service

Figure 3. The Number of Registered Members of the LG DTB Service

The LG DTB Service provides 7,700 digital talking books to about 7,500 registered members at present. Members have accessed the service more than 80,000 times annually, and they have downloaded or listened to books over 150,000 times in 2012. As illustrated in Figure 2 and Figure 3, the usage of the LG DTB Service has consistently increased in line with the number of registered members.

3   DAISY PRACTICES OF THE LG DTB SERVICE

DAISY Collection Strategy
Based on user group studies, the DAISY collection development policy of the LG DTB Service has been established to focus on new publications. LG Sangnam Library selects newly released books, and produces their alternatives in the DAISY format, which makes it possible to provide new books to the print disabled within one month after publication.

In Korea, in the majority of cases, libraries for the print disabled are in charge of producing alternative materials because Korean copyright law allows only libraries to copy or digitize books and transfer them online for the print disabled. At an early stage, LG Sangnam Library paid attention to the fact that other libraries for the print disabled primarily produced Braille books and audio books, and it takes time to produce one Braille book or a audio book. In those systems, the print disabled must wait for a couple of months to read a new book through the library services. By optimizing the production process of the DAISY 3.0 Text Only format, LG DTB Library can provide new books to users within a month after publication, which also enables the print disabled to timely share their opinions on social issues and helps them to actively participate in discussions in their communities.

In terms of subject categories, literature including novels, essays, and poetry accounts for the largest portion (44%) of the DAISY collection in the LG DTB Service. The unique distribution of subject categories is related to the characteristic features of our user group because our book selection is determined by the priority of users' requests with reference to the sales ranks of new books in major bookstores, book reviews, and book recommendations. According to user age distribution statistics, 32 percent of our users are over 60 years old, which means that they belong to the economically inactive segment of the population in Korea. Throughout user surveys, they have clarified that they read books for leisure, and prefer literature to other subject categories.
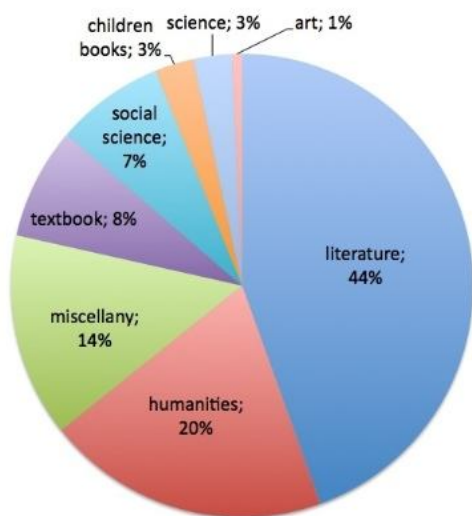

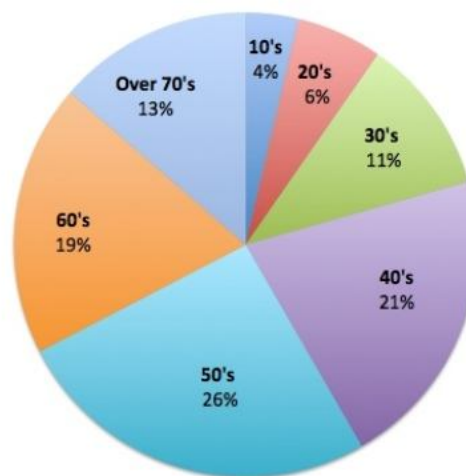**Figure 4.** Distribution of Subject Categories   **Figure 5.** Distribution of User Ages

In the development of LG DTB Service's collection, another important strategy is to support the print disabled to help them improve their job skills in their career. One of job skills that LG Sangnam Library takes account of is that of being a professional massage therapist. In order to protect the livelihood of the blind, Korean law stipulates that only the blind can be granted a certificate of being a professional massage therapist. The law results in the state that the majority of the blind are employed in work as professional massage therapists, as over 30 percent of our users are professional massage therapists. They, however, complain about a lack of resources to study professional massage skills. Professional massage therapists must fulfil the requirements to study Korean traditional medical treatments, including acupuncture and modern medical science concentrating on anatomy and physiology. The textbooks on those subjects include a lot of pictures and charts to explain a human body, which causes an increase in labor costs and a degree of difficulty in producing alternative materials for the print disabled. Since LG Sangnam Library paid attention to the fact that DAISY is one of the best ways to produce alternative materials for those textbooks with its XML-based structured format, LG Sangnam Library has regularly developed a DAISY textbooks collection for professional massage therapists in LG DTB Service. The DAISY format allows us to describe a picture and a chart in the structured format. The textbooks collection is a recorded collection which is used frequently and steadily. The librarians at LG Sangnam Library are

proud of the fact that most books in the collection are the only alternative in DAISY format for the print disabled in Korea.

The DAISY Production Process

The LG DTB Service adds about 10 new books to its collection every week. For its weekly update, LG Sangnam Library has produced all the books in the DAISY 3.0 Text-Only DTB format since 2010. The library produced digital talking books in the DAISY 2.02 format from 2006 to 2009, and changed its policy to adopt the DAISY 3.0 format in 2010. It began producing the DAISY 3.0-format books, and at the same time started converting the DAISY 2.0-format digital talking books to DAISY 3.0-format books.

To produce the DAISY 3.0-format digital talking books (DTBs), LG Sangnam Library needed to develop a new production process, because the DAISY 3.0 format is totally different from DAISY 2.02, though the both formats are based on the same concepts and purposes. The DAISY 3.0 format has more in common with the EPUB format as an XML-based format rather than the DAISY 2.02 format in XHTML. While DAISY 2.02 consists of six types of DTBs, DAISY 3.0 is simplified with just three types – 1) Audio with NCX (DTB with structure), 2) Audio and full text (DTB with full text full audio), and 3) Text and no audio (DTB with text only).

As a result of an investigation, LG Sangnam Library concluded that the text-only type is the most appropriate type for the LG DTB Service. Text-Only DTBs include text and structured information, and require TTS (Text-to-Speech) to convert the text into voice audio. The LG DTB Service was able to provide Text-Only DTBs easily because TTS systems are already embedded in its Web server and in each LG Talking Book Phone for the print-disabled. A text-only DTB brought benefits to the LG DTB Service in several respects. First, the simple structure of the text-only type made it possible to simplify the production process and to reduce the time and labor. As result, the LG DTB Service was able to provide new books to users in a shortened period of time. Next, the small file size of a Text-Only DTB is suitable for a mobile service because it solves the problem caused by the limit of memory resources in a mobile device such as a feature phone or a portable DAISY player. Third, its light size gives benefit to users with its quick download time; it takes only a few seconds to download a Text-Only DTB.

The production process of the DAISY 3.0-format Text-Only DTB for the LG DTB Service consists of the following steps.
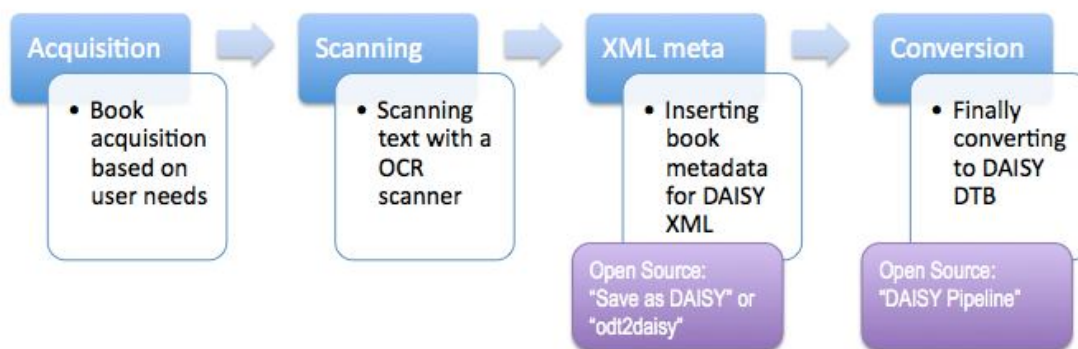

Figure 6. The DAISY Production Process

Step 1) Acquiring the selected books.

Step 2) Scanning the books with an OCR scanner to extract the text, and then reviewing the extracted text by comparing it with the original text.

Step 3) Inserting book metadata, including page and chapter information, and then converting the metadata-added text to DAISY XML with conversion software, 'Save as DAISY' or 'odt2daisy.'

Step 4) Finally, converting DAISY XML to Text-Only DTB with the conversion software 'DAISY Pipeline.'

When librarians at LG Sangnam Library set up the process, they tried to maximize the use of open source software in order to save resources. They have adopted a few open source pieces of software such as odt2daisy and DAISY Pipeline, which freed the library from software development and maintenance. odt2daisy is an OpenDocument extension to convert OpenDocument Text (ODT) to DTB, and DAISY Pipeline is a cross-platform open source framework for DTB-related document transformation while supporting various formats. The librarians found that odt2daisy was not able to create a DTB using the Korean language and its characters, though it is compatible with 27 other languages. Therefore, the librarians attempted to find a solution and solved the problem by using both odt2daisy and DAISY Pipeline – odt2daisy to convert the original work into DAISY XML, and DAISY Pipeline to future convert the XML into a DAISY DTB. The librarians also developed a manual to stipulate the production process, which includes knowhow to deal with the Korean characters in producing DTBs.

The DTB production process of LG Sangnam Library is well appreciated in the Korean library community because the process has been optimized based on the abundant DAISY experiences of LG Sangnam Library. The library provides the manual and knowhow about the DAISY production process to other libraries to enable them to develop DAISY collections.

4 SMART TRANSFORMATION IN THE LG DTB SERVICE

LG Sangnam Library plans to release its first smartphone LG Talking Book Phone (LG Talking Book Smartphone), and launch a new service unit, the smartphone targeted LG DTB Service (Smart LG DTB Service) in October 2013. Immediately after the advent of smartphone technologies, LG Sangnam Library, a future-oriented library, paid attention to the huge potential of the use of smartphones as part of the library service. Though it has prepared for a smartphone targeted service of the LG DTB Service since 2011, it took much longer than expected to remove the technological barriers to realizing the Smart LG DTB Service. The accessibility of the user interface, the quality of the mobile TTS, and mobile DRM technology were core technical problems. In order to solve these issues, LG Sangnam Library has actively strengthened cooperation with technological partners, including LG Electronics. In the final outcome, it has overcome these barriers and has completed the system development of the Smart LG DTB Service.

Smartphone Development for the LG DTB Service

If LG Sangnam Library launches an audio book service for the non-disabled through smartphones, developing a special smartphone is not a must. In the case of an audio book service for the print disabled, the library, however, has to develop a specialized phone for the service because there is no smartphone providing full accessibility to the print disabled with

high-quality Korean TTS in Korea. The goal of the development of the first LG Talking Book Smartphone is to provide reasonable accessibility to the print disabled with high-quality Korean TTS and build a good foundation for the DAISY library service. For this development project, LG Sangnam Library took charge of planning and designing of its user interface based on users' needs, while LG Electronics developed the software and hardware of the LG Talking Book Smartphone.

Figure 7. The LG Talking Book Smartphone for the Smart LG DTB Service and its Home Screen

The participants considered the accessibility of the user interface to be most crucial. As most smartphones have adopted a touchscreen interface, traditional mobile phone keypads are disappearing, which makes it more difficult for the print disabled, especially the blind and visually impaired, to handle smartphones compared with featured phones. Based on an understanding that voice support is essential to improve accessibility, project participants have mounted Android Jelly Bean on the LG Talking Book Smartphone, and have activated TalkBack, an accessibility tool in Android. TalkBack helps the print disabled interact with a smartphone by providing voice support and vibration feedback. The global version of TalkBack, however, does not support the Korean language fully. Therefore, LG Electronics has customized TalkBack and related functions to support the Korean language better and to fit with the behavior of Korean users.

Another important element in the project is high quality TTS. Because most of the user interface is based on voice support, the quality of the TTS is very important. LG Electronics has developed the Korean TTS since the feature phone development, and its quality has satisfied the print disabled. For this project, LG Electronics has enhanced the quality of the Korean TTS by adding more special characters and daily-used foreign words to the TTS DB and has developed a smart mobile version of the TTS.

In addition, the LG Talking Book Smartphone is designed to provide physical hotkeys to activate specific functions that the print disabled use frequently, such as going to the accessibility settings, and opening the Smart LG DTB Service application. LG Q Voice, a voice-recognition personal assistant tool, is also assigned to one of the hotkeys. By using the hotkey, the print disabled can easily command LG Q Voice to fulfil their requests – opening certain applications, writing a text message, searching for information and so on.

The Smart LG DTB Service and its Mobile Application

The Smart LG DTB Service is ready to be launched in October 2013 as the first DAISY digital talking book library service for a smartphone in Korea. The mobile application of the Smart LG DTB Service is designed to provide easy access to the LG DTB collection with high usability and to exploit the advantages of the DAISY format with its embedded DAISY player.

In terms of innovative approach, a new and differentiated concept is incorporated in the Smart LG DTB Service – a global DTB service. Unlike the feature phone era, the smartphone era enables a mobile application to be used by people all around the world, which makes a global service possible via mobile phones. LG Sangnam Library has loaded two service modules – the Korean domestic module and the global English module – onto the application of the Smart LG DTB Service. When the application launches, it automatically identifies the TTS language setting on the phone and mounts a proper service module according to the language setting. If a user using the Korean TTS on his or her phone opens the application, the application automatically shows the Korean DTB service while mounting the English DTB service for the English TTS setting. For the global service, LG Sangnam Library has developed the English DTB collection with copyright free content.
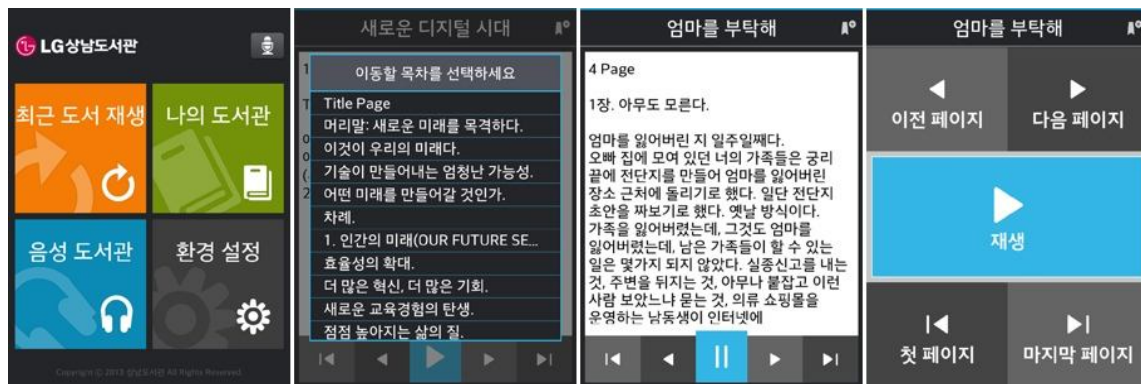

Figure 8. Screenshots of the Smart LG DTB Service Application

To provide easy accessibility and high usability, the application is developed to follow the Android Accessibility Guidelines and the Android User Interface Guideline. According to the users' needs, navigation in a book has been enhanced with a quick move function, and the accessibility setting option is improved by adding new options including a speech speed/pitch controller, and a text/background color controller. Compared with the feature phone model, more smart functions are embedded into the library application. For example, Google Voice Search is installed in the search box so that users can search for a book as well as the menu of the application by voice.

Under the Korean copyright law, a library that provides content for the print disabled has a duty to provide content only to registered users and to prevent copyright infringement by non-registered users. Therefore, LG Sangnam Library has implemented DRM (Digital Rights Management) modules in its mobile and Web system of the LG DTB Service. For the Smart LG DTB Service, the library has to implement a new DRM module downloadable on a smartphone. Though the DRM implementation has had a high cost because of its technology-intensive features, the library is satisfied with the DRM module with its high performance.

The system requirements for the application are Android OS Jelly Bean or above, and users have to activate TalkBack and TTS to run the application. Though the application has been developed to work with various TTS products, LG TTS has the highest compatibility with the application.

LG Sangnam Library plans to distribute the application in two ways. First, the application will be pre-loaded on LG Talking Book Smartphones. When the library distributes the phones for free to the print disabled in Korea, they will easily find the application on the phones and will be able to use it immediately. Next, the library will release the application on Google Play for global users.

5 CONCLUSION AND FUTURE PLANS

While LG Sangnam Library has performed a leadership role in DAISY practices in Korea, cooperative partnerships with other organizations is an indispensable part of its innovative service process. Sometimes partnerships help the library to find solutions to its own problems; sometimes it builds partnerships to share its DAISY expertise and knowhow with other organizations.

In developing the DAISY DTB collection, LG Sangnam Library has built a strong partnership with the National Library for Individuals with Disabilities (NLID). Both libraries share some part of their DTB collections, and LG Sangnam helps NDID with the quality management of NDID's DTB collection. In respect of the DAISY content distribution, LG Sangnam Library has interest in cooperation with manufacturers of DAISY portable devices. As the first case of cooperation in content distribution, LG Sangnam Library goes hand in hand with HIMS (HIMS International Corporation), a manufacturer of DAISY players based on DRM sharing. The library gives registered users of HIMS access to the LG DTB collection via Book Sense, a compact portable DAISY player manufactured by HIMS. The usage of the DTB collection by Book Sense has gradually increased. LG Sangnam Library will continue to expand its partnerships with related organizations.

DAISY is now evolving into an integrated format with EPUB 3.0. LG Sangnam will keep an eye on the evolution, and will cope actively with the changing paradigm. In addition, it will continue to concentrate on the improvement of its library service to fulfil the needs of the print disabled in an innovative way.

LG Sangnam Library is now getting everything in readiness for the launch of the Smart LG DTB Service in October 2013. Because it has completed the development of the LG Talking Book Smartphone and the application for the Smart LG DTB Service, it now focuses more on user preparation training for the smart service. It has a plan to visit major cities in Korea to conduct offline training programs. When the Smart LG DTB Service opens, the authors believe, the new service model will serve as a new information pipeline to the print disabled in Korea within the tradition of innovative practices of LG Sangnam Library.

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