

# **Bilingual M-Learning Resources Development based on iPad-User Interaction Technology—A Case Study of the Bilingual e-textbook of the Kazak Alphabet**

Liu Junling and Zhang Yawen<sup>2</sup>

*Changji University, Changji, Xinjiang Province, 831100; Xinjiang normal University, Xinjiang Province, 830054  
164505333@qq.com*

## **Abstract**

*With the development of network technology and the popularization of mobile terminals, the research and development of M-Learning resources based on iPad-user interaction technology, namely e-textbooks, has attracted increasing attention in global educative reforms. On the basis of the research on iPad's user-machine interaction technology, this paper takes the bilingual e-textbooks development of The Kazak Alphabet as an example. It proposes basic steps and framework of the research and development and summarizes the key interaction technology and the ways of realization of preparing, developing, packaging and publishing in the hope that it can provide the foundation for the development of M-Learning and bilingual education.*

**Keywords:** *iPad user-machine interaction technology M-Learning resources e-textbooks*

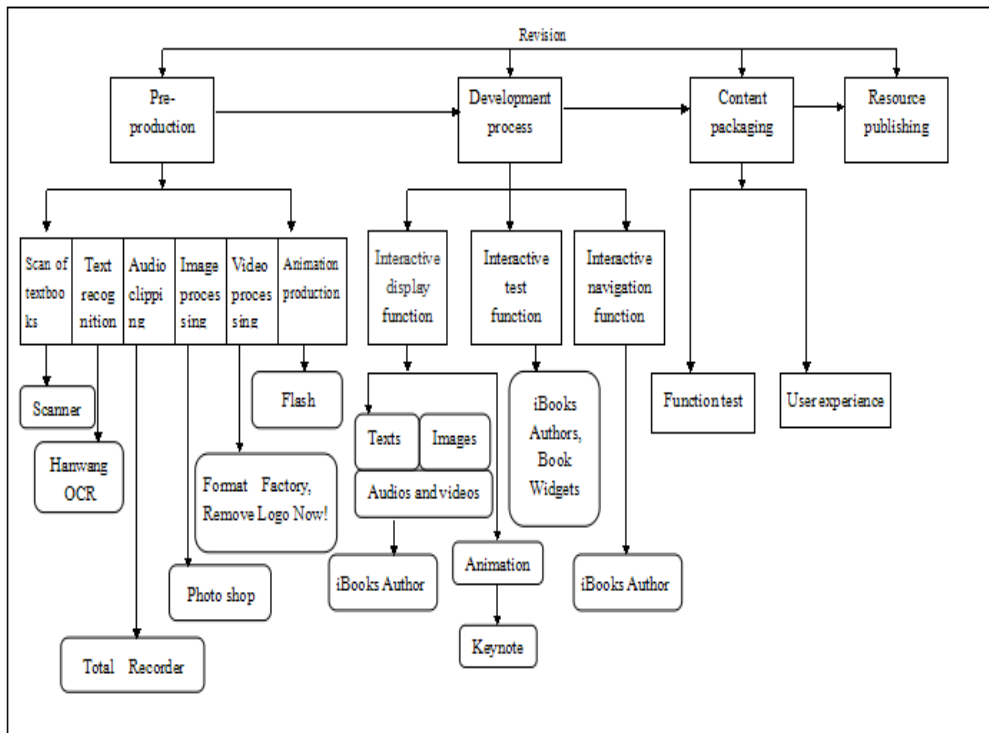
## **1. Introduction**

With the development of mobile technology, portable mobile devices, such as tablet computers and smart phones, have become popular and a new kind of learning—Mobile-Learning (M-Learning) emerges after Distance-learning (D-Learning) and E-Learning. M-Learning resources are an important part of M-Learning system and the foundation of all M-Learning activities. E-textbooks are M-Learning resources based on mobile terminals. As electronic books or documents complied like paper books with interactivity, portability, mobility, and rich media, they can accord with students' reading patterns; facilitate the organization of learning activities, and accord with course objectives and requirements <sup>[1]</sup>. At present, the platforms for the development and application of e-textbooks are Android, Windows and IOS. Relatively speaking, IOS can provide better solutions to the development, circulation, and perfect display on terminals of e-textbooks. iPad is a table computer based on IOS and its common development software for user-machine interaction technology are iBook's Author, keynote and Book Widgets etc. Therefore, on the basis of the most popular intelligent terminal in the industry—iPad, this paper takes the bilingual e-textbooks development of *The Kazak Alphabet* in Daily Kazakh course which is for Han students in junior high school as an example to explore bilingual M-Learning resources with good interaction—bilingual e-textbooks development technology for iPad.

## **2. iPad Bilingual E-textbooks Development Steps and Framework**

The development of bilingual e-textbooks based on iPad-user interaction technology consists of the following steps: preparing, developing, packaging, and publishing. Preparing mainly involves the gathering and processing techniques of

various related material, including scanning of paper texts and graphics, text recognition, image processing, audio and video clipping, and Flash making etc. On the basis of overall plan for bilingual-textbooks, namely organization structure design, content presentation plan, layout plan, and material gathering and processing, developing mainly comprises layout design, integrating texts and graphics, interactive design and production, proofreading and auditing. It also involves the realization of main development technology, including interactive display, test, and navigation. Packaging and publishing are mainly about function test, user experience, and publishing in App Store. The whole framework is presented in Figure 1.



**Figure 1. Development Framework of Bilingual E-textbooks based on iPad-user Interaction Technology**

### 3. Preparing Steps of iPad Bilingual E-textbooks

Preparing is to mainly employ scanning software, such as Hanwang OCR, Photoshop, Total Recorder, Format Factory, and Remove Logo Now! And Flash in Windows.

#### 3.1 Scanning of Paper Texts and Graphics

The aim of this step is to convert the paper texts and graphics of *The Kazak Alphabet* into electronic images and texts through scanner.

Technical realization: ①Install scanning software suitable for scanner. ②Determine proper scanning mode. ③Optimize scanner's resolution ratio. ④Set scanning parameters according to scanning object. ⑤Set file size. ⑥Place paper scanning object—*The Kazak Alphabet* according to your needs. ⑦Find the optimum scanning area, scan and save the PDF file.

Notice: Correct scanning color and seek ideal scanning location.

### 3.2 Text Recognition

This is to convert e-images and e-texts of *The Kazak Alphabet* into editable digital texts through Hanwang OCR.

Technical realization: ①Open Hanwang and PDF of *The Kazak Alphabet*, choose the reminder of splitting pages and click yes. ②Press Shift and select the whole page. ③Press F8 and automatic identification will start.

Notice: If only part of texts is needed, drag mouse to select the region, right-click and choose “send text to Word”.

### 3.3. Image Processing

Photoshop is adopted to achieve the restoration and modification of The Kazak Alphabet's digital image material in terms of resolution, color, and size *etc.*

Technical realization: ①Use “crop tool”, “Remix Tool” or “Perspective Crop Tool” in Patch Tool to revise the scanned image of The Kazak Alphabet. ②Modify definition of the image. ③Set color rendition. ④Remove logo or unnecessary text.

Notice: The image is saved in the format of PNG with the resolution of 1024×748.

### 3.4. Audio and Video Clipping

Total Recorder V8.4.4990 is used to clip audio and video materials of The Kazak Alphabet.

Technical realization: ①Install/ Chine size/ restart/ register. ②Open supporting e-books with audio or let Kazakh broadcaster get ready. ③Start the software. ④Click **【Record】** and then **【Recorder】** of e-textbooks to record audio materials or the standard broadcast of Kazakh letters from Kazakh broadcaster. After that, click **【Save As】** in **【File】** menu and name the file according to naming convention, such as C5U111-1.MP3. Then click **【Change】** button and select **【mpeg layer-3】** in the format list of the pop-up dialog box and then click **【Yes】** and **【Save】** .

Notice: Pay attention to the order of recording and play of audio materials and unify the length.

### 3.5. Video Modification

Format Factory and Remove Logo Now! are used to convert format of and remove logo from video material of The Kazak Alphabet.

Technical realization:

Format Factory: ①Open Format Factory. ②Choose video type for material to be converted and MOV format. ③Add the already-made Flash file of the writing of Kazakh alphabet. Click Yes and conversion starts.

Notice: The key to video definition is size and the key to audio quality is bit rate (The adjustment is customized).

Remove Logo Now ! :①Install and run Remove Logo Now!. ②Use Rectangle or Custom Shape Tool and select delete zone in the video material.

Notice: Before conversion, output format and coder can be customized; logo remove is a process of transcoding which leads to decrease in quality.

### 3.6. Flash Production

Flash is employed to make Flash material of writing of *The Kazak Alphabet*.

Technical realization: ①Install Macromedia Flash 8 and run it. ②Create a new page. ③In the new page, type in black Kazakh alphabetic text in the default Layer 1. ④Create Layer 2, type in the same gray text and make it coincide with the text in Layer 1. ⑤Create Layer 3, select the first key frame, import audio file of Kazakh alphabet and choose the






corresponding name of audio file in **【Sound】** panel. Then click the second frame and drag till the end of the audio file. ⑥Select Layer 2, remove part of strokes of text through inserting key frames and scattering images and then repeat the above operations at the interval of several frames until it has the same length as audio file in Layer 3 and strokes are all removed. ⑦Select Layer 1, copy the first frame and paste at the same length as Layer 2 and 3. Finally test the effect of Flash. The output video format is AVI and audio format is 8 bit stereo with 44 kHz.

Notice: The length of audio frame accords with the flash of text.




## 4. Developing Steps of iPad Bilingual E-textbooks


Apart from composing and integrating material which has been gather and processed before, the developing step also involves the realization of interactive display, test, and navigation. The main application software are iBooks Author, Keynote and Book Widgets in Mac OS.



### 4.1. The Realization of Interactive Display

①**Text:** In the normal toolbar of iBooks Author, select **【TextBox】** , and type in text in the pop-up edit area; then select **【Inspector】**  in the normal toolbar, and choose **【Text】**  in the popup window to change character pitch, array pitch, and space before paragraph and after paragraph of text. After that, use **【Graphic】**  to set color, line type, shadow, and opacity of the exterior border of image in the text edit are. At last, select **【Font】**  to modify font set, series, typeface, size, and color of the text.

In addition, in order to facilitate the bilingual study of learners, this paper provides Kazakh-Chinese bilingual tags for those new words and terms through Word list in the book template of iBooks Author in order to help with bilingual study of learners at any time at any place. In the production process, Word list can be added with other items (vocabulary and definition) as well as graphics, videos, and other media at any time. Learners only need tap vocabulary with tags and then they can see its Kazakh pronunciation and meaning in the overlay; they can also see related vocabulary and index links in the Word list.

②**Image:** Select **【Widget】**  / **【Gallery】**  in the normal toolbar of iBooks Author. Then gallery edit area and **【Inspector】** / **【Widget】**  will pop up. Select **【Layout】** to set title, illustration and background Kazakh images and display, add or delete images in **【Interaction】**. The image is suggested to be 1024x748 in the format of PNG.

③**Audio and Video:** Select **【Widget】** / **【Gallery】**  in the normal toolbar of iBooks Author. Then edit area of Audio and Video together with **【Inspector】** / **【Widget】** pops up. Select **【Layout】** to set title, illustration, and background of Audio and Video of *The Kazak Alphabet*. Click **【Background】** option box and also **【Graphic】** / **【Fill】** tools to set the appearance (filling, line type, shadow) of Audio and Video edit area's exterior border. In **【Interaction】** tab, select and modify the display effect of audio files (button, rubbing strip, and image). In the edit area of Audio and Video, display, add or delete Audio and Video. It is suggested that video should be in the format of MP4 and M4V.


④**Flash:** Open Keynote 5.2 and select template in the **【Theme】**  in the toolbar so as to add or modify materials of text, graphics, audio, video, and Flash. Then open iBooks Author and click **【Widget】** / **【Keynote】**  in the normal toolbar. Edit area and **【Inspector】** / **【Widget】** window pop up. Choose **【Interaction】** and click **【Select】** button after **【Keynote File】** to import already-made Flash keynote file of the writing of *The Kazakh Alphabet*. Then click **【**




Interaction】 and select Display Transmission Control button to add progress control

button and effect picture is



#### 4.2. The Realization of Interactive Test

①In iBooks Author, select 【Widget】 / 【Test】  and then edit area and 【Inspector】 / 【Widget】 window pop up. In 【Interaction】 , click 【+】 tool to add questions and choose question types and number of answers. This operation can be repeated if needed. In 【Layout】 , modify 【Title】 and 【Background】.

②In Book Widgets, open 【Widget library】 , click 【select one answer】  , choose 【question】 button to change the title in 【questions】 panel and add answers in 【answer】  . Click 【Audio】  to import audio files, select background among images in 【image】 and provide students with image material. Thus, the synthetic interaction of listening, looking, selecting, and writing can be

achieved and effect picture is




#### 4.3. The Realization of Interactive Navigation

①In iBooks Author, add 【TextBox】 to realize interactive navigation. Add TextBox on the page and delete “type in text”. Click 【Inspector】 / 【Widget】 and choose title/ /interactive, in 【Interaction】 . Delete English words and keep Chinese words like “interaction 1.1” and then drag this TextBox out and hide it.

②Select the text which will have hyperlinks. Copy it and cover the original text. Choose the covering text and in 【Inspector】 / 【Link inspector】 of the toolbar, click “make it become a hyperlink” under 【Hyperlink】 button and choose corresponding “Interactive” under “Name”.

### 5. Packaging and Publishing of iPad Bilingual E-textbooks

In iBooks Author, open iPad bilingual e-textbooks of *Daily Kazakh*, link iPad to the computer, open iBooks and click 【Preview】  button and then the book can be published and previewed on iPad. After debugging and modifying, we can upload it to App Store to provide free or charged download.

### 6. Conclusion

With several learning paths and rich media, iPad bilingual e-textbooks can help learners interact with text, images, audios, videos, Flash and various aptitude tests in many ways, choose learning paths, pace, and interactive ways at their will so learners do not have to rely on teachers’ uniform cramming. This breaks the traditional linear teaching method which synchronizes teaching and learning and makes traditional teacher-student conversational mode transfer into man-machine conversation mode, which is conducive to the realization of nonlinear, asynchronous, layering, and interactive teaching and learning. It can not only effectively expand the coverage of quality bilingual material of teachers and textbooks in regions inhabited by ethnic groups but also promote the balanced development of education and teaching between regions, urban and rural areas, and schools.

Although some more intelligent interactive functions are constrained by iPad app development and some problems like terminal restriction, sharing, and transcending platforms emerge, iPad bilingual e-textbooks accord with the intention of the new round of reform in basic education and promote the development of M-learning. Those problems can be better solved as time passes by and technology advances.

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## Author

**Liu Junling** (1983- ), female, Han, from Zibo City Shandong Province, postgraduate, master's degree, college lecturer. Major research direction: M-learning, information technology. QQ:164505333@qq.com, Tel:13565319136.