Developing multimedia supplementary materials to support learning beginning level Chinese characters

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Abstract. Studies investigating beginner Chinese learners' character learning strategies found that learners considered orthographic knowledge the most useful factor (Ke, 1998; Shen, 2005). Orthographic recognition correlates with character identification and production and can be used by advanced learners to solve word identification problems (Everson, 2007). The central question, then, is how learners and educators can develop this ability. Component analysis and semantic radical instruction throughout the process of teaching beginner learners of non-character background can help learners create meaningful content out of seemingly disconnected information (Zahradníková, 2016). The multimedia material presented in this paper is specially designed with this in mind. A future research study will be conducted to understand the efficacy of modules and practices.

Keywords: Chinese character learning strategies, Chinese L2 beginners, multimedia material.

1. Introduction

Automatic identification of around 2,000 Chinese characters is required to understand the average written text, which makes developing "Chinese writing system competence" crucial before learners can proceed to "reading competence" or "writing competence" (Guder, 2007). Thus, the teaching of specific features of *hanzi* at the beginning level is often considered the most important step for reading or writing competence. Specifically, the typical curriculum includes the units of Chinese character formation, types of structure of compound characters,

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and stroke order. While moving on to the daily instruction of characters, however, the instructor usually faces the challenge of time constraints when attempting to fully elaborate upon character formation and learning strategies used for character retention, recognition, and production. Instead, mechanical copying and mindless memorization are often the main strategies adopted, which may lead to confusion in retrieval and production (Zahradníková, 2016).

Recently, some online materials and apps have been developed to support Chinese character learning, many focusing especially on conventional stroke sequence. The improvements help learners observe and recall characters better. However, there has been lack of digital material specifically designed to support the development of orthographic recognition for beginner learners.

The multimedia material presented in this paper was created to fill this gap. The overarching goal is to develop the integral knowledge and effective strategies for learning Chinese characters. This paper will introduce the design and the examples of multimedia materials created, and outline the methodology for a future research study.

2. Multimedia material

The learning material is novice level HSK (Chinese proficiency test) vocabulary which includes a total of 300 words with 450 characters. Using this as a starting point means that the materials developed are based on widely-accepted standards. The materials mainly focus on the details of each character, including its type (pictogram, ideogram, compound ideograph, phonogram), pronunciation, meaning, etymology, stroke order, components, and use of image-based annotations.

The theories and research findings for multimedia CALL design, cognitive theories and Chinese character learning, character learning strategies, and CALL-assisted vocabulary-learning techniques were all considered in the design.

2.1. Theoretical model

The principle for the design follows Chapelle's (1998) interactionist model. The model guides the CALL design and research on effectiveness based on the hypotheses about SLA. Table 1 demonstrates the components of the multimedia material applied to help learn Chinese characters.

Table 1. The structure and components of the multimedia material

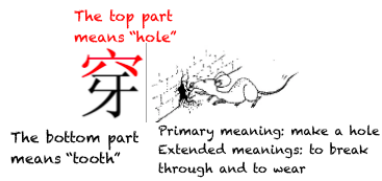
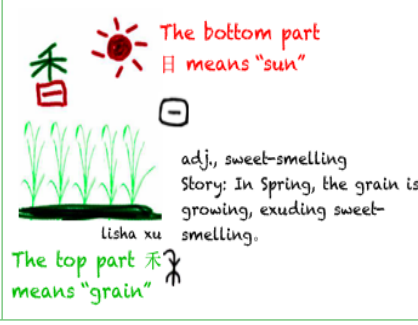
Interactionist Model	Components	
Input	Present the learning materials in multimode content	• text • pronunciation in audio • image annotation • character handwriting sheet • character handwriting video demonstration
Apperception	Prompt learners to notice important aspects of the Chinese characters	• character's type • pronunciation • meaning • etymology • components
Comprehension	Decode the components of the characters	• semantics and cognitive analysis
Intake	Recognize the characters and their components	• formation and structure • stroke • stroke orders • meaning and pronunciation
Integration	Develop the learning strategies for Chinese characters	• analyze radical components and morphological structure of the characters • establish association among sounds, shapes and meanings • create images of the characters
Output	Get observable results about character retention and production	• flashcards • games • exercises

2.2. Multimodal content

Cognitive information processing theories are used to guide the design, since the character learning process necessarily involves the brain's ability to process

information; the learner uses a variety of strategies to encode the characters' information for comprehension and memorization (Shen, 2011). This multimedia material has its roots in the framework of dual coding (Paivio, 1969), level-of-processing (Craik & Lockhart, 1972), and multi-modalities theories (Engelkamp, 2001). The content aims to create diverse effects with the multimodal input of text, etymology, image annotations, and audio and video to encode cues to aid information recall and deepen the information process. Table 2 presents the examples from the content created[2].

Table 2. Cognitive information process theories and pedagogical examples

Cognitive information process theories		**Pedagogical examples**
Dual coding theory	"Any information can be encoded as verbal or imagery presentation. If both methods are used, it will result in better learning and memorization than signal coding"	
Level-of-processing theory	"A deeper processing of the information is meaningful, with which the information will not be easily forgotten."	
Multi-modalities	"If we use multi-modalities instead of a single modality to encode information, when we recall the information, each model will contribute a unique cue to the recall of the information."	

2. Examples of multimedia material created can be found at https://research-publishing.box.com/s/i2gnd0ljb3gc7k8ntsw885lif9uenx57

2.3. Proposed study

The proposed study aims to investigate overall effectiveness of the digital components. The qualitative analysis will be conducted using a questionnaire and interviews. The experimental group consists of about 400 beginner learners. The statistical information will be summarized and student feedback will be analyzed by inductive procedure (Seliger & Shohamy, 1989). The study seeks to answer research questions including: to what extent do the modules help beginner-level learners develop the orthographic recognition and self-elaboration skills required to learn Chinese characters?; to what extent do the modules help beginner-level learners to recognize, retain, and produce the 450 most commonly used characters?; and how do learners reflect on their materials' use to support effective self-study of Chinese characters?

3. Discussion and conclusion

For novices, especially learners who use an alphabetic writing system, Chinese characters may appear to be a meaningless tangles of lines. It is crucial for the instructor to help illuminate the characters' shape, pronunciation, and meaning, as well as to help learners develop effective strategies to learn the characters. This can be a big challenge for both instructor and learners, due to a large amount of characters and limited short-term memory. In addition, if there is a lack of opportunity to practise and frequently review newly-learned characters, the characters may never enter the learner's long-term memory, nor will they be automatically recognized (Shen, 2011).

As a large variety of CALL materials become more accessible to learners, the demand for effective self-paced study in informal learning environments increases dramatically. To this end, to fill in the gap of pedagogically-sound multimedia material to help learners to learn beginning-level Chinese characters, the aforementioned learning materials were developed. Data collection and analysis will be conducted, from which the materials may be enhanced with better insight into learners' perceptions thereof.

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