



## Effects of type of multimedia strategy on learning of Chinese characters for non-native novices



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### ABSTRACT

The purpose of this study was to examine the effects of multimedia strategies for instructional techniques and practice on non-native novices' Chinese character learning performance and cognitive load. Two types of multimedia instructional presentations – radical-highlighted and stroke-pronunciation – and two types of practice – visual cue and voice cue – were implemented. Participants were 81 non-native novices randomly assigned to one of the four experimental groups, namely radical-highlighted visual-cue, radical-highlighted voice-cue, stroke-pronunciation visual-cue and stroke-pronunciation voice-cue. An Internet-based e-learning course on the basis of Chinese characters was implemented and delivered as experimental instruction using a Moodle platform. The results show that, for non-native novices, the stroke-pronunciation (SP) strategy of showing strokes with pronunciations is better than the radical-highlighted (RH) strategy, enabling the novices to achieve better performance in identifying Chinese radicals. The significant two-way interactions suggest that (1) the SP presentation should be delivered with the voice-cue (VoC) practice to elicit better performance in writing and in identifying characters and strokes, and (2) the RH presentation should be delivered with visual-cue (ViC) practice to elicit better performance in character writing. Furthermore, participants showed similar levels of perceived cognitive load toward the stroke-based task and the radical-based task. However, when the SP presentation was delivered with the VoC practice, participants revealed lower perceived cognitive load toward the writing task.

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## 1. Introduction

In recent years, due to the enormous global economic change, learning Mandarin Chinese has become a pervasive need for people of different societies to get familiar with both the Chinese language and culture (Lo Bianco, 2007). Such an increase in Chinese learners has resulted in greater demands of educational materials. Accordingly, research on Chinese learning for non-native novices has come into focus in the academic field. With the increasing usage of information technology, the application of multimedia technology in facilitating Chinese learning has become an emerging trend and is promoted by the researchers of Computer-Assisted Language Learning (CALL). Due to the fact that characters are the most fundamental objects of the Chinese language, identifying and comprehending the meanings of characters is the very first step for non-native novices in learning Chinese. However, foreign learners usually encounter difficulties in learning Chinese characters because Chinese characters look like pictures, and foreign learners can hardly understand the meanings. According to the *dual-coding theory* (Paivio, 1986) and the *cognitive theory of multimedia learning* (Mayer, 2001), appropriately presented information with visual and verbal codes can enhance learning. In light of these concerns, the purpose of this study is to examine the effects of multimedia instructional strategies on non-native novices' learning of Chinese character identification and meaning comprehension.

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## 2. Literature review

### 2.1. Chinese as a global language

In the 21st century, with intense globalization and human migration taking place both within and beyond the Asian-Pacific region, there is a rising need in the general ability to communicate effectively with people across languages and cultures. This is also why Mandarin Chinese has extended its reach past Asia and is gaining momentum among people of different ethnic and language backgrounds (Duff & Lester, 2008; Lo Bianco, 2007). Primarily learned by non-native speakers mainly for literary and political purposes, Chinese is now learned in almost every continent for much wider ranges of purposes, and in both formal and informal educational contexts. Duff and Lester (2008) have indicated the four main contexts in learning oral and written Chinese as (1) commercial contexts, (2) touristic spheres, (3) scholarly and academic contexts, and (4) within diaspora communities. A North American census indicates that Chinese is among the most widely used language internationally, next in line to English, French and Spanish (Li & Duff, 2008). As further stated by Crystal (2003), there is an estimated population of 650 million speaking Chinese and over one billion using written Chinese today. Since 2004, the National Office of Chinese Language Council, based in Beijing, China, has been establishing Confucius Institutes worldwide for the promotion of the teaching, learning and testing of Chinese as a foreign language (Duff & Lester, 2008). By 2006, the Chinese government had reported that there were approximately 30 million non-natives studying Mandarin Chinese (Graddol, 2006; Ye, 2011). Today, North Americans can even learn Chinese in public bilingual schools featuring English and Mandarin Chinese (ECBEA, 2007).

Such an increase in Chinese learners has resulted in greater demands of unconventional and easy-to-access learning materials. It has also placed Chinese as a foreign language (CFL) not only on the educational market but also along other research topics in the academic field (Xinhua, 2008). At the turn of the 21st century, the Asia Society made a report on the inadequacy and low quality of existing CFL programs worldwide despite the significance of Chinese on the international level (Ye, 2011). This slow development in the CFL field is mainly the result of three factors missing in many CFL programs: (1) a standardized syllabus, mainly regarding the controversy of teaching Chinese characters at an early stage or not, (2) attention to different linguistic characteristics as most existing programs adopt an Europeanized framework (Zhang & Li, 2010), and (3) attention to learners' differences in goals, identities and capabilities (Kondo-Brown & Brown, 2008). To overcome this, the renowned international association of Teachers of English to Speakers of Other Languages (TESOL) has been publishing a series called Integrating ESL Students into Chinese Classroom Settings in the past decade, which focuses on teachers' standards and the design of teaching materials. Similar standards for the teaching and learning of Chinese as a global language are also currently being developed (Duff & Lester, 2008).

### 2.2. Learning of Chinese language

To learn a foreign language, learners need to acquire the main target language skills, namely listening, speaking, reading, and writing. According to Krashen's "input" assertion of (1981), the acquisition of a foreign language should be based on meaningful and comprehensible learning and practice. Hearing or reading a language does not guarantee language acquisition. In order for sufficient acquisition to take place, learners must first allow themselves to be "open" to the input, so it can be utilized for acquisition. However, most individuals only have the ability to progress along a natural order that is one step further to their current state of linguistic competence, which may not sufficient for complete language comprehension (Krashen, 1981). For non-native novices in Chinese learning, among the first steps in this natural order are identifying Chinese characters and understanding the meanings of Chinese characters (Zhao, 2008).

Chinese characters were originally presented as drawings that resembled shapes of actual objects (Kuo & Hooper, 2004), and were known as picture-shaped words. Characters, rather than phonetics, are the fundament of the Chinese writing system. Characters are based on two orthographic structures – strokes and components – and can be mainly categorized into (1) pictographs, (2) indicatives, (3) ideographs and (4) semantic-phonetic compounds. As stated by Ye (2011), pictographs and indicatives contain only one semantic component (radical) and are "pictorial representations" of objects and ideas respectively. These two typologies are often combined to form compound characters, namely ideographs and semantic-phonetic compounds. An ideograph forms a new meaning which is deprived from the meanings of its components. On the other hand, a semantic-phonetic compound – the most commonly seen typology of the Chinese character – consists of one component representing the phonetics (phonetic component) of the character and the other component the meaning (semantic component) (Ye, 2011).

There are two main challenges for non-native learners in learning Chinese characters. The first is the complexity of the graphic configuration of Chinese characters, and the second is the lack of obvious sound-script correspondence (Shen, 2005; Shen & Ke, 2007). Because of the orthographical rather than alphabetical nature, Chinese characters are considered one of the most challenging languages to learn for non-natives (Shen, 2004). The written system of the Chinese language poses a big challenge for learners with Romanized languages as their native languages (Chuang & Ku, 2011). Furthermore, Kuo and Hooper (2004) stated that Chinese language teachers often neglect the semantic (visual) and phonetic (verbal) aspects of Chinese characters, which are among the most confusing aspects in Chinese learning for non-native novices.

To help language learners overcome the above-mentioned challenges, many researchers have examined the impacts of cognitive processing on character learning and have provided evidence to support the idea that providing visual cues for recall results in better learning performance (Shen, 2004; Shen & Ke, 2007). Therefore, it is important for Chinese language teachers to employ suitable teaching methods and strategies to assist non-native novices in learning Chinese characters. Applying appropriate learning strategies can help learners effectively learn the main target language skills – listening, speaking, reading, and writing (Oxford, 1990). Hence, a positive approach in teaching a language should be based on both the understanding of different strategies and on the expertise in applying these strategies to practical language-learning settings. According to Shen's research (2005), the most frequently used strategies are orthographic-knowledge-based strategies which make use of the three aspects of radical knowledge, namely graphemics, semantics and phonetics. Non-native learners can use these aspects of radical knowledge as cues to encode characters and transmit newly-acquired knowledge into their cognitive processes. Taft and Chung (1999) mention that emphasizing radical structures when the Chinese character is first encountered, is the most effective way to build a relationship between character and radicals. Another research suggests that well-designed multimedia is

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