

The Development of Integrative Character-word Mandarin Teaching Strategy Based on Chinese Character Structure Database

陳學志

Hsueh-Chih Chen



邁向頂尖大學計畫

Aim for the Top University Project

The development of Chinese characters orthographic database

- Radicals, as components of Chinese characters, and configurations are integral parts of Chinese orthography. Current studies have proved the psychological entity as well as pedagogical meaning of radicals; however, little has done for properties of radicals.
- The present study aims to **develop a data-driven and exhaustive searching knowledge base – Chinese Orthographic Database Explorer (CODE)**, which consists of a radical set and a traditional Chinese character set.

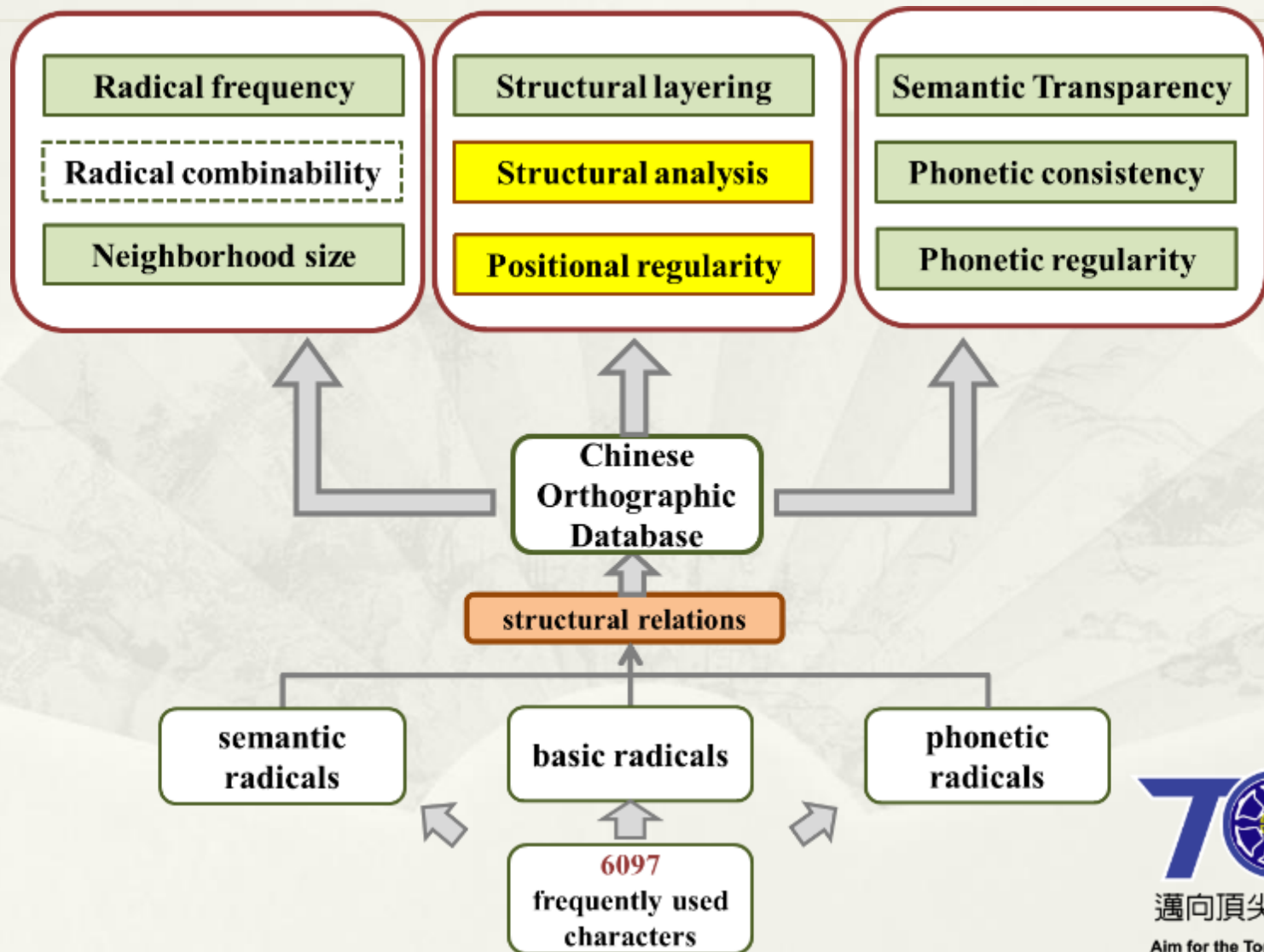
The development of Chinese characters orthographic database

- The database contains the sounds, meaning, radicals, and word frequency of the 6097 most frequently-used traditional Chinese characters, as defined by the Big-5 encoding method (Chinese Foundation for Digitization Technology, 2010) and the Chinese Knowledge and Information Processing group (Academia Sinica, 2010).
- Beginning from radical level, 446 Chinese radicals and 11 categories of the configurations are defined by analysis of 6097 frequently-used traditional Chinese and 2167 frequently-used simplified Chinese .
- In stroke level, 35 strokes are concluded and relative positions of adjoining and adjacent sequent strokes are defined, also stroke orders of each Chinese character are recorded.

The development of Chinese characters orthographic database

- Computing by parameters of Chinese character constituent, those frequent characters are exhaustively analyzed while several orthographic indices are created.
- Indices recorded in the database include the amount of characters made from these radicals, the frequency, semantic transparency, phonetic regularity, phonetic consistency and neighborhood size of these radicals, structural analysis and the positional regularity of these radicals.

According to the orthographical database, we develop the character-based pedagogical model



3-stage orthographic knowledge based method for teaching Chinese character

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1. Teaching Basic Characters via key-image strategy

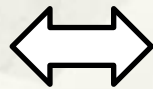
2. Character-Family: Radical-to-Compound Characters

3. Teaching Complicated and Similar Characters via Creative Elaboration Strategy

Teaching Basic Characters via key-image strategy

- Keyword strategy contributes to enriching vocabulary in learning second language (Atkinson, 1975; Cohen, 1987). Learning Chinese characters by the images relevant to semantics and glyph is helpful (Kuo & Hooper, 2004).
- Key-image: an image which is partially similar to the glyph and connects the semantics of Chinese character. Students could associate the glyphs and semantics of Chinese characters by the help of these key-images.

父



Father

Character-Family: Radical-to-Compound Characters

- Compound characters that contain semantic radicals or phonetic components are the main teaching material. Start of with simple phonetic/semantic radicals and then extend to the more complicated derivatives. This allows us to teach numerous characters at the same time.
- Around 800-900 characters will be taught at this stage.
- The goal of this stage is to teach the orthographic knowledge. Therefore, teaching materials are arranged according to categories of different orthographic knowledge.

Character-Family page



國立臺灣師範大學
National Taiwan Normal University

短文：孔先生是小學老師，他很喜歡穿牛仔褲。在學校，他教孩子問好、用筷子、寫名字和存錢。

家長字說明：

子帶出來的6個字，有5個字（孔、孩、字、存、學）的部首是子。部首是子的字，意思直接或間接跟「孩子或美好」有關。

There are six characters under the radical, 子. 子 serves as the dictionary classifier for five characters(孔, 孩, 字, 存, 學) out of the six. Characters with the dictionary classifier 子 directly or indirectly relate to "children or beauty."



Radical-Group-Text: essays are written by senior Chinese teachers to help learners memorize and learn the Chinese characters in the character-family .

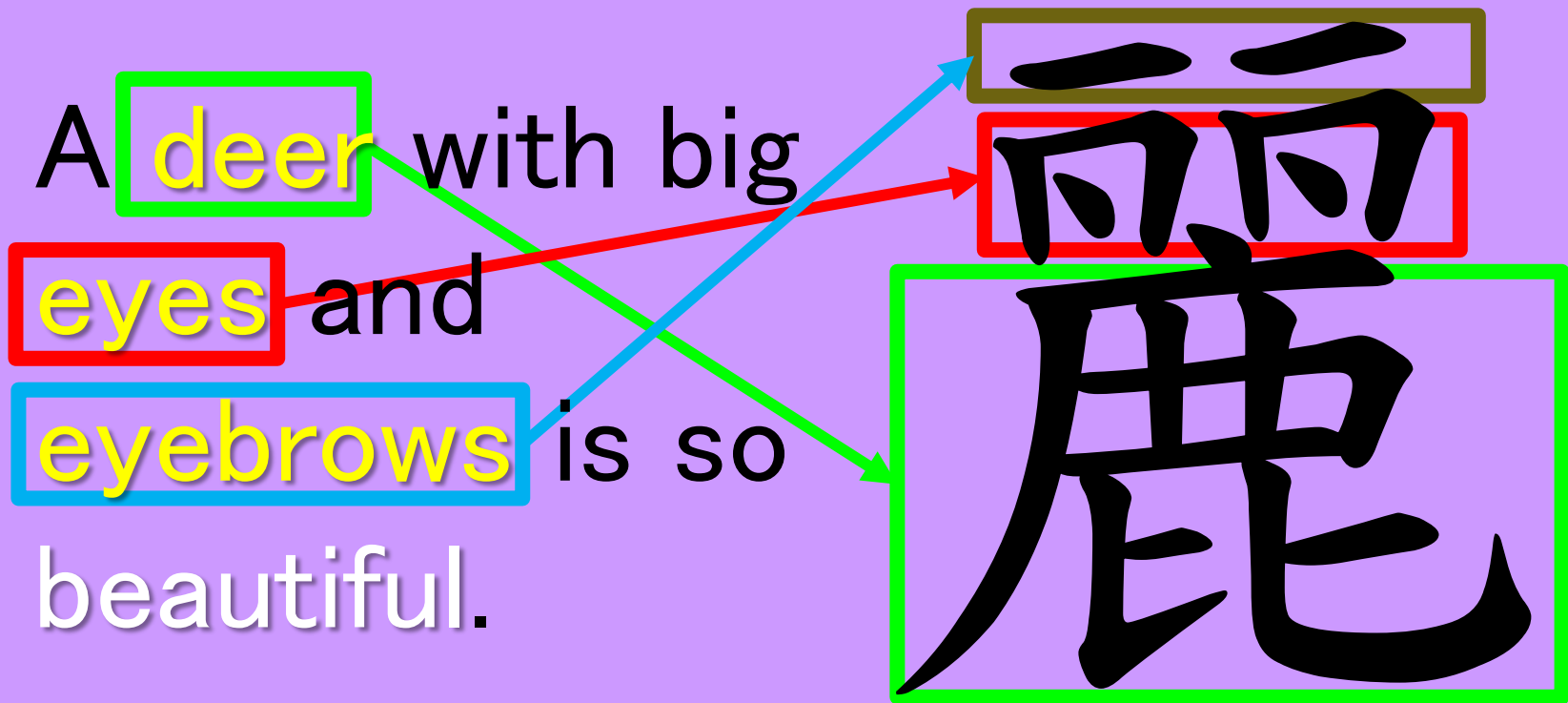
Description for a Root: Descriptions of orthographic, phonetic and semantic messages for roots are provided

Tree of a Radical: character-family is presented in a hierarchy diagram which shows the relationships between character-families by tree of a radical for learners to understand which derivative characters are derived from the root. Learners click on the **roots and derivative characters in character-family**, and then connect to the content page of relevant orthographic knowledge to learn more information of Chinese characters

Teaching Complicated and Similar Characters via Creative Elaboration Strategy

- The goal of this stage is to teach complicated or similar characters, which contain numerous strokes or radicals. There are around 70 of those characters.
- We will be using creative elaboration strategy to help students learn the characters, e.g. imaginative stories or other mnemonic aids.

Creative Elaboration Strategy



一雙大眼睛大眉毛的鹿很美麗

Creative Elaboration Strategy



Department

Heads of government *departments* must *listen* the voice of the people with the *right* ear.

部長用**正確 (right)**的**耳朵**傾聽人民的聲音



Accompany

Van Gogh's *left ear* has *left* and is no longer *accompanied* by him.

梵谷的**左耳**已經離開 (leave的過去分詞**left**) 不再**陪伴**他。



The effects of key-image strategy to
Chinese as second language learners.

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Introduction

- Keyword mnemonic contributes to enriching vocabulary in learning second language (Atkinson, 1975; Cohen, 1987). Learning Chinese characters by the images relevant to semantics and glyph is helpful (Kuo & Hooper, 2004).
- We develop a unit of “Key-images” that help the CSL/CFL learners to acquire the characters and connect the semantics and glyph as the same time.
- Present study aimed to investigate the influence of key-image strategy to Chinese as second language learners.

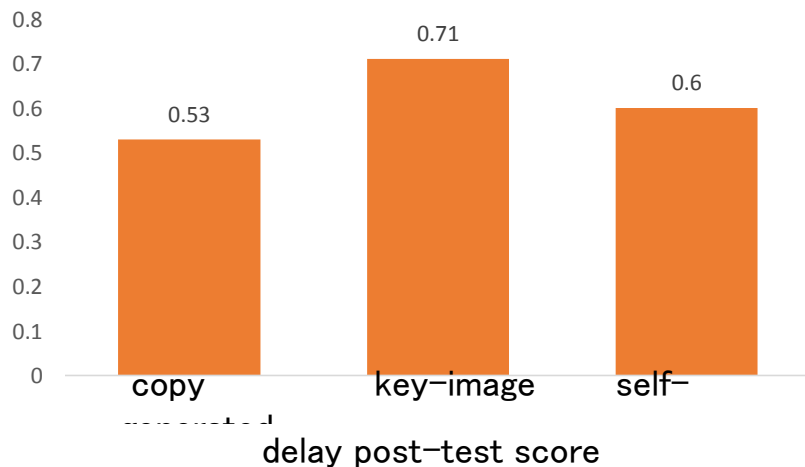
The effects of keyword-image strategy to Chinese as second language learners.

- **Assumption:**
Learning Chinese characters with “Key-images” strategy provides more effective way than traditional rehearsal method and self-generated association strategy for CSL/CFL learners.
- **Participants:**
25 non-Chinese native speakers (acquainting with English), including 14 males and 11 females.
- **Design:**
Within-subjects design. Every participants received three learning conditions: (1) copy the definition, (2) key-images associating, (3) self-generated association, and then received post-tests. Dependent variables were correct rates of post-tests, including immediate post-test and delay post-test (after 1 week), and the preference of three learning strategies.

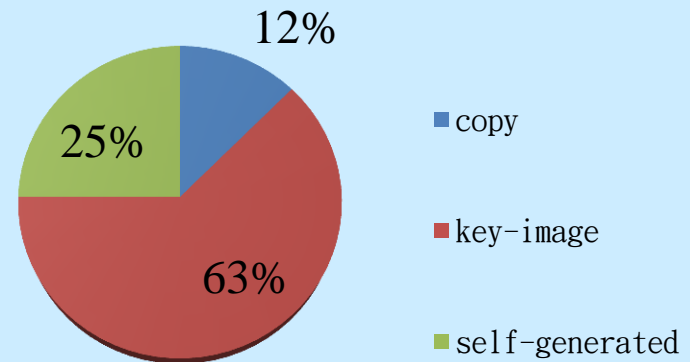
The effects of keyword-image strategy to Chinese as second language learners.

• Results :

- No significant difference was found among immediate post-test scores of three learning conditions.
- Comparing the delay post-test score of three learning conditions, the correct rate of key-images strategy was significantly higher than that of other conditions.
- 63% participants preferred key-images strategy when learning Chinese characters.

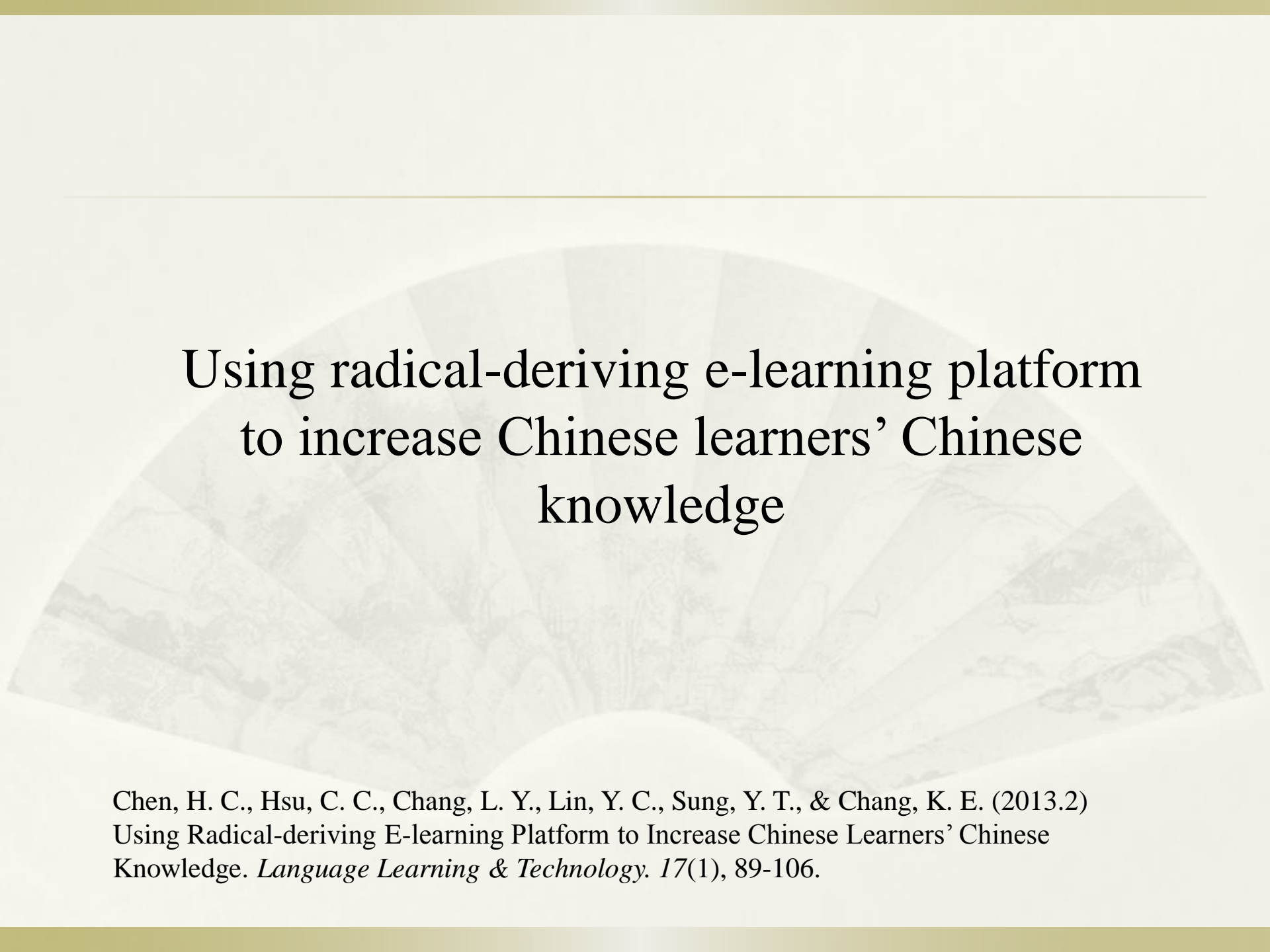


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The effects of keyword-image strategy to Chinese as second language learners.

- Summary :
 - The effect of key-images strategy was supported in present study. Key-images learning material is helpful to retain the semantic and glyph knowledge of Chinese characters, and motivate CSL/CFL learners.
 - Material of Key-images for Chinese character learning will soon be published. More Key-images material will continuously be developed in the future.



Using radical-deriving e-learning platform to increase Chinese learners' Chinese knowledge

Chen, H. C., Hsu, C. C., Chang, L. Y., Lin, Y. C., Sung, Y. T., & Chang, K. E. (2013.2)
Using Radical-deriving E-learning Platform to Increase Chinese Learners' Chinese
Knowledge. *Language Learning & Technology*. 17(1), 89-106.

Using radical-deriving e-learning platform to increase Chinese learners' Chinese knowledge.

Introduction

- The present study aimed at investigating the effect of the radical-derivative Chinese character teaching strategy on enhancing Chinese as a foreign language (CFL) learners' Chinese orthographic awareness.
- We chose radical-deriving strategies as our instructional approach as they have been recognized as effective methods in previous studies. Beyond this, we designed an E-learning platform that provides multimedia learning materials and a user-friendly operational interface.
- We expected that the combination of content and technique would collectively contribute to productive Chinese learning.

Using radical-deriving e-learning platform to increase Chinese learners' Chinese knowledge.

Method

- A nonequivalent pretest-posttest quasi-experiment was conducted, with **129 Chinese-American CFL learners** as participants (69 people in the experimental group and 60 people in the comparison group).
- **Chinese Radical-deriving E-learning Platform:**
 - This platform is developed on the basis of teaching orthographic knowledge. **It is currently used by the School of Continuing Education, NTNU, for research purposes** (<http://coolch.sce.ntnu.edu.tw/index.php?do=login>).
 - Chinese characters that contain semantic radicals or phonetic components are the main teaching material. We start with simple phonetic/semantic radicals and then extend to the more complicated derivatives. This allows us to teach numerous characters at the same time. The goal of this platform is to teach orthographic knowledge. Therefore, teaching materials are arranged into orthographic categories.

Using radical-deriving e-learning platform to increase Chinese learners' Chinese knowledge.

Method

- **Instruments:**

A series of tests conducted by Hung and her college (Huang & Fang, 2006a, 2006b) consists of three constructs of Chinese orthography: radical recognition, semantic radical awareness, and phonetic radical awareness.

- **Procedure:**

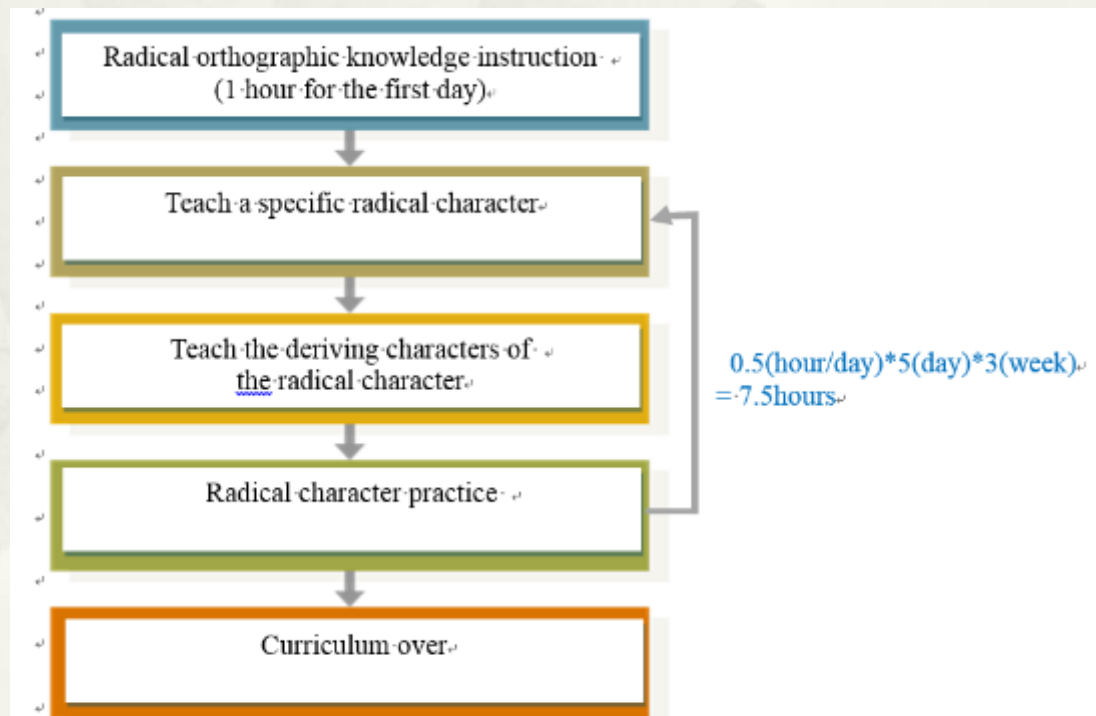


Figure 4. The instruction workflow of the experimental group instructors teaching with the learning platform.

Using radical-deriving e-learning platform to increase Chinese learners' Chinese knowledge.

Results

Table 2. The mean, standard deviation, and the adjusted mean of the two groups

			Experimental Group (<i>n</i> = 69)			Comparison group (<i>n</i> = 60)			<i>F</i>
			<i>M</i>	<i>SD</i>	Adjusted Mean	<i>M</i>	<i>SD</i>	Adjusted Mean	
	Radical Recognition	pretest	18.68	4.73	20.94	18.42	4.59	19.57	5.292
		posttest	20.86	2.57		19.67	4.46		
subtests	Semantic	pretest	6.67	4.06	7.33	7.27	4.16	6.07	7.300*
	Radical Awareness	posttest	7.16	3.06		6.27	2.90		
	Phonetic Radical Awareness	pretest	5.83	3.53	8.09	6.53	3.73	5.93	15.073*
	posttest	7.88	3.75	6.17		3.56			
total	Orthography Knowledge Test	pretest	31.17	9.93	36.12	32.22	10.35	31.84	12.928*
		posttest	35.90	7.59		32.10	8.84		

Note. The scores in the total test and three subtests are 37, 22, 13 and 12, respectively. **p* < .05.

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Results

- We used MANCOVA to compare the difference of the means of the two subtests between the experimental group and the comparison group. Significant difference was found ($\Lambda = .879$, $F(2, 124) = 8.51$, $p < .001$).
- The post hoc comparisons:
 - In the test of **semantic radical awareness**, the adjusted mean of the **experimental group (7.33)** was significantly higher than that of the **comparison group (6.07)** ($F(1, 126) = 7.300$, $p = .008$).
 - In the **phonetic awareness test**, the adjusted mean of **the experimental group (8.09)** was also significantly higher than that of **the comparison group (5.93)** ($F(1, 123) = 15.073$, $p < .001$).

Using radical-deriving e-learning platform to increase Chinese learners' Chinese knowledge.

Summary

- The digital radical-deriving strategy used in this research is different from the traditional teaching methods. **Such a strategy has more interesting and efficient ways to encourage active learning. The systematic learning strategies help learners to better control the contents and principles of Chinese radical characters, accelerating the learning of more Chinese characters.**
- In the future, this radical-deriving e-learning system will be supplemented with practices for words, sentences, and articles, and will also have online tests.