

THE DEVELOPMENT OF MOBILE CHINESE CHARACTER LEARNING AND DIAGNOSTIC SYSTEM

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Outline

- Introduction
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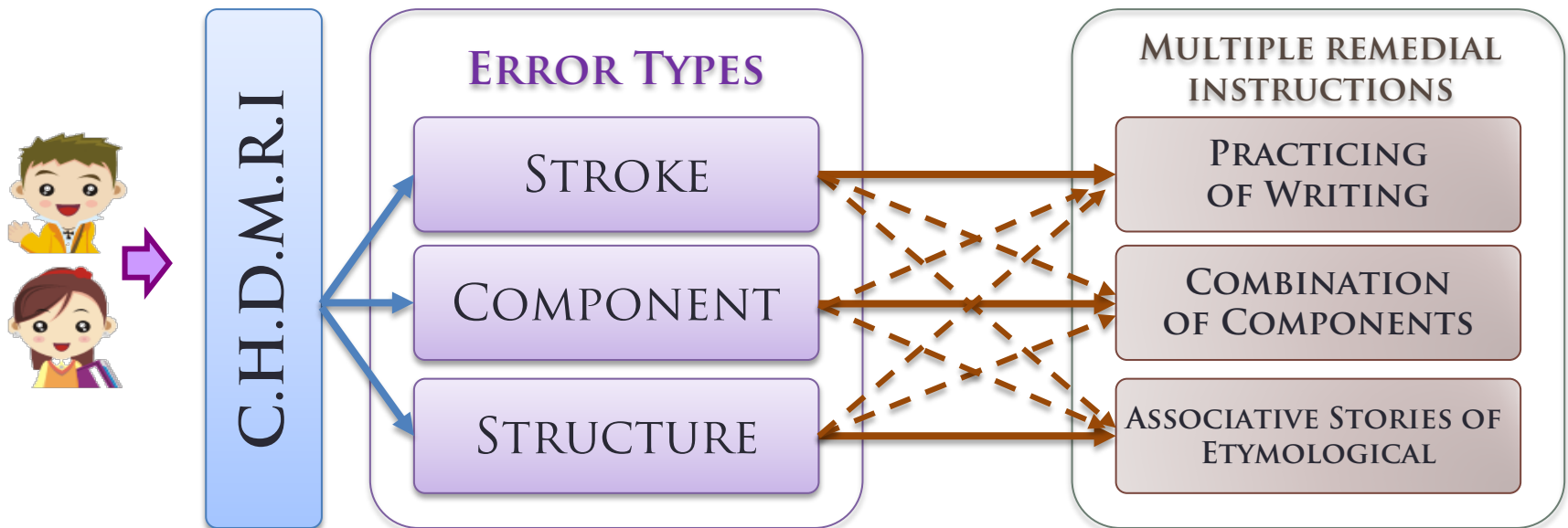
Introduction

- Increase learning motivation
 - Diversification (Naiman, Frohlich, Stern & Todesco, 1996 ; O'Malley & Chamot, 1990)
- Overcome difficult points
 - Adaptive remedial instruction (Chang, Hsin-Jen · 2001)
- Practice adaptability and individuality
 - Computer assisted learning (Bordbar, 2010 ; Kern & Warschauer, 2000 ; Yang, 2001)
- Biased errors of Chinese character handwriting diagnosis mechanism
 - Flexible, Self-adaptive
- Improve Chinese as a foreign language (CFL) learners' ability to write and memorize Chinese characters

Theoretical Framework

- Concepts

CHINESE CHARACTER HANDWRITING DIAGNOSTIC AND MULTIPLE REMEDIAL INSTRUCTIONS SYSTEM



Theoretical Framework

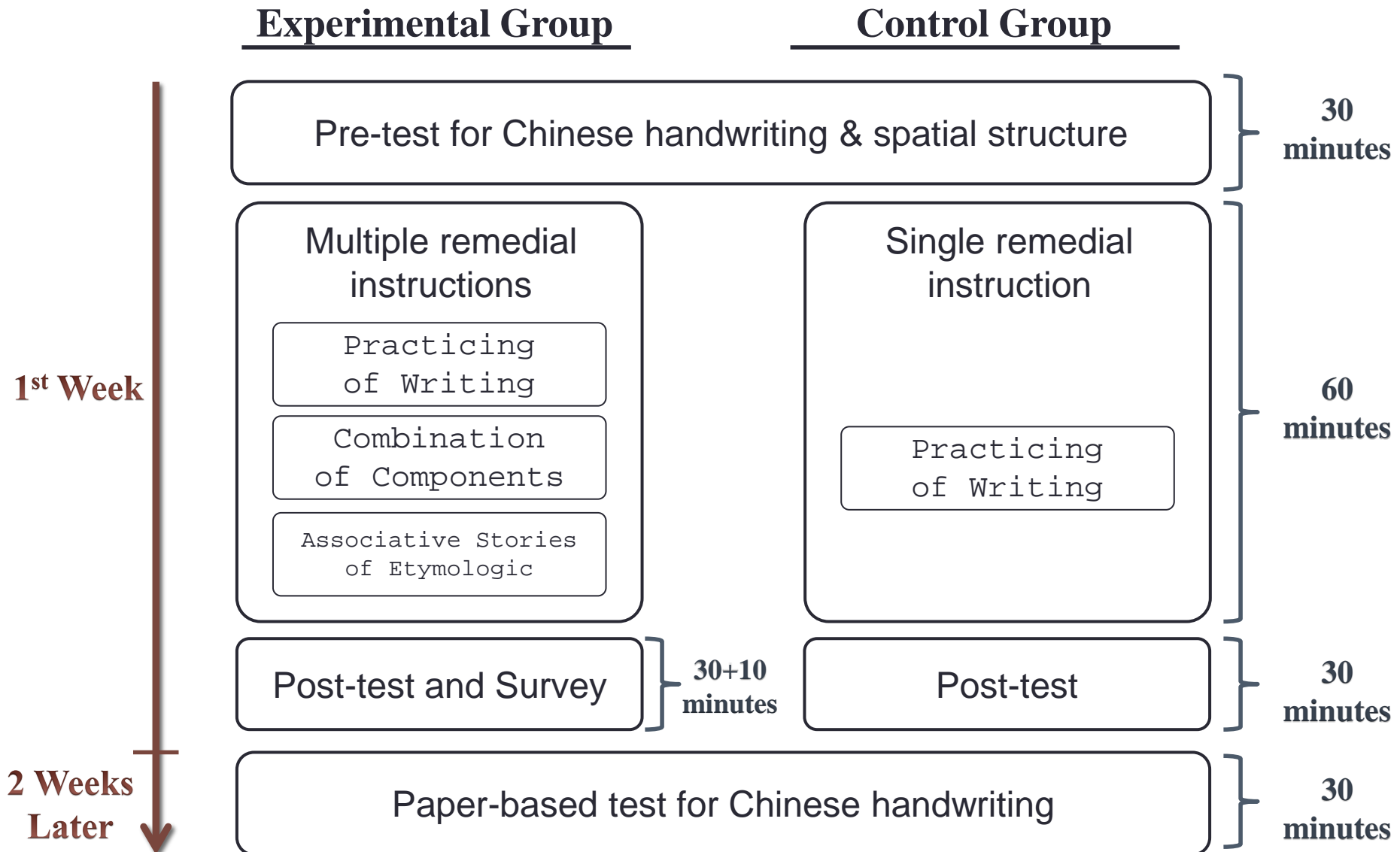
- Exploration

- 1) The affection to the learning performance of the CFL learners who used the CHDMRI system
- 2) The affection to the learning performance between the Sinosphere CFL learners and the non-Sinosphere CFL learners
- 3) The affection to the learning performance between the CFL learners with more than 120 hours of instruction and the CFL learners with less than 120 hours of instruction.
- 4) The affection to the traditional paper-based test of the CFL learners with multiple remedial instructions

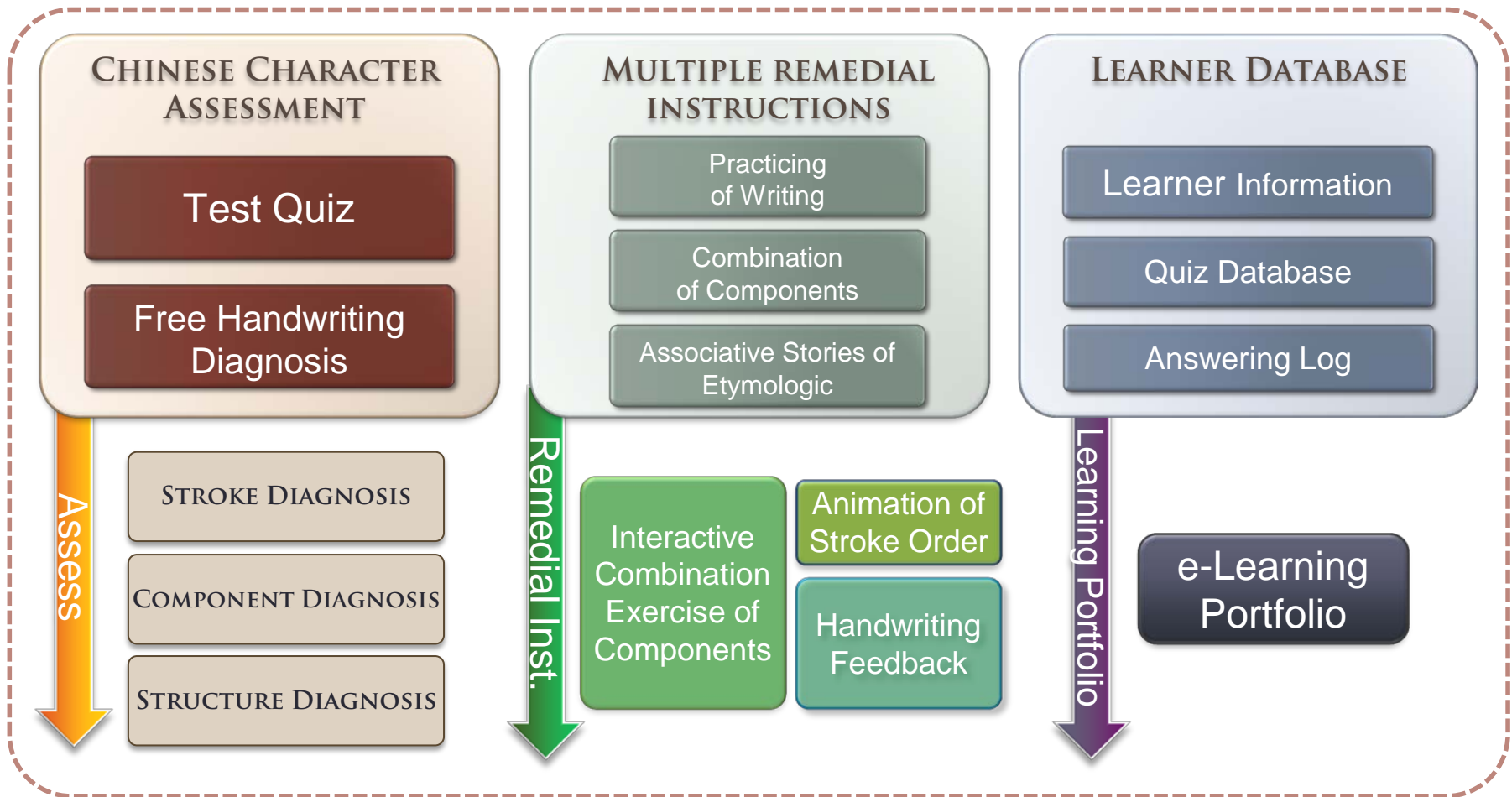
Research Participants and Limitations

Research Scope	Participants	<ul style="list-style-type: none"> • Beginning Level of the Steering Committee for the Test of Proficiency – Hanyu (SCTOP). • EG (Experimental Group) of 32 learners, CG (Control Group) of 31 learners, totally 63 learners are participated. • Sinosphere (漢字文化圈) and non-Sinosphere are defined according to the learner's native language. • The time spent to learn Chinese is separated by 120 hr.
	Test Contents	<ul style="list-style-type: none"> • The scope of the tests was based on Practical Audio-Visual Chinese, Books 1 & 2, 2nd edition.
Limitations	<ul style="list-style-type: none"> • The research is only considered about the beginning level of SCTOP. • The research result about the Chinese character learning may not imply the ability of the Chinese learning. 	

Experimental Procedure



THE FUNCTIONALITIES OF C.H.D.M.R.I



Chinese Character Assessment

1. Test Question – Handwriting Test

Learners were allowed to write down the Chinese word according to the each question shown with picture and phonetic spelling. There were 30 questions and the whole test was limited in 30 minutes.

漢字 Assessment

Welcome! AA1

Remaining time

Time 29:2

Question: 1

詞彙(Phrase): __天

拼音(Pinyin): xià

注音(Zhuyin): ㄒㄧㄚˋ

Picture

Writing frame

「Clear」 to re-writing

「OK」 to next question

Finding out a word from the picture and the phonetic spelling

Chinese Character Assessment

2. Test Question – Spatial structure Test

Learners were allowed to answer by select the only one option. the each question shown with picture and phonetic spelling . There were 30 questions and the whole test was limited in 30 minutes.

The screenshot displays a software interface for a Chinese character assessment. At the top, it says "Welcome! AA1" and "Assessment". Below this, there is a "Time" field. The main section is titled "Question 1" and contains a yellow box with the character "生" (shēng). To the right of the character is a wooden structure with two rows of seven compartments each, containing various spatial arrangements of the character's components. A hand cursor is pointing at the first compartment of the bottom row. Below the structure is a blue "Next" button. On the right side of the interface, there is a vertical scroll bar and a brush icon. The text "Example" is visible in a small box. The overall layout is clean and user-friendly.

The outcomes of Chinese Character Assessment

The outcomes showed the results from both the Chinese character handwriting test and the spatial structure test. According to the score of strokes and the word's structure, the learner could know what words needed improvement.

漢字測驗 Welcome! AA1

★ 再加油! Could be better!

筆畫筆順 Stroke & Order	部件 Component	結構 Structure
句, 國, 區, 去, 每, 對, 有, 工, 找, 出, 家, 買, 用, 年, 好, 夏, 看, 山, 回, 分,	勺 口 口 或 匚 品 土 人 人 母 堂 大 月 工 才 戈 出 六 采 四 貝 用 年 女 子 一 白 久 彡	句, 國, 區, 去, 每, 對, 有, 工, 找, 出, 家, 買, 用, 年, 好, 夏, 看, 山, 回, 分,

Write More

Practice More

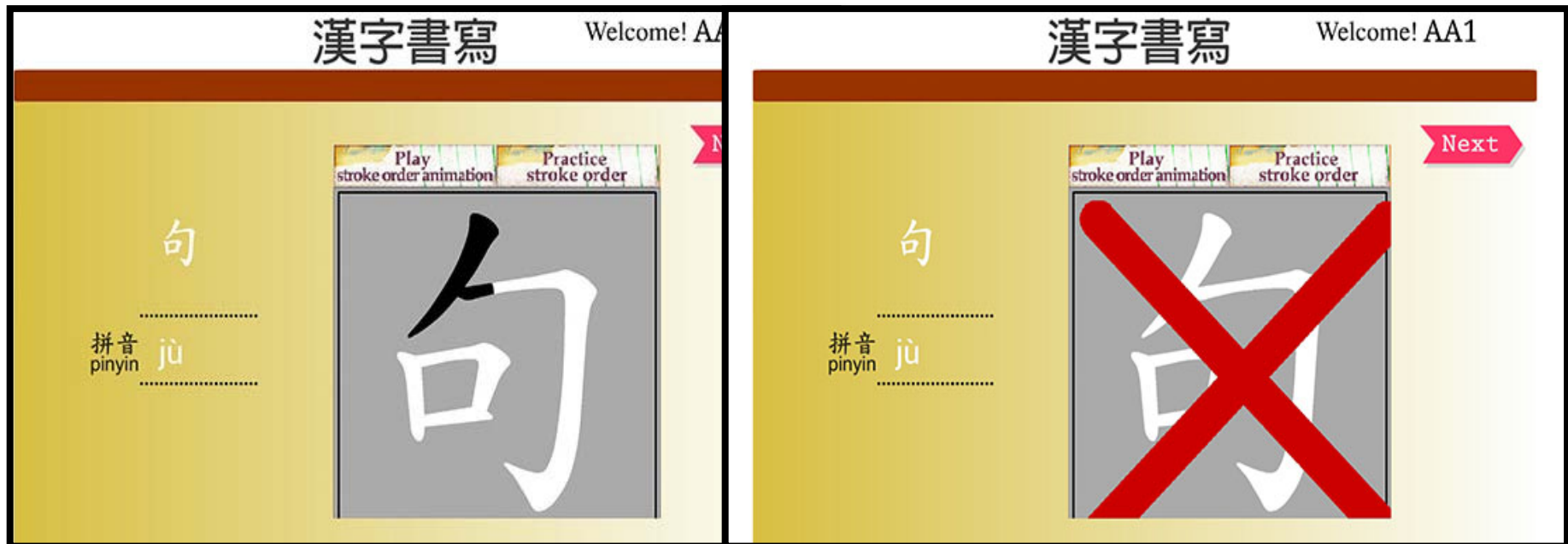
Study More

The test result was divided into three error types.

Tap buttons to enter the corresponding remedial instruction.

Multiple Remedial Instruction Material

- Calligraphy Imitating
 - ✓ Calligraphy Imitating made learners practice with the recognized model.
 - ✓ Computer animation provided the correct stroke orders.



Multiple Remedial Instruction Material

- Combination Exercise of Components
 - ✓ Spatial structure selection made learners construct the concept of the spatial knowledge of the word.
 - ✓ Combination provided the correct components corresponding to the spatial structure.

漢字測

舉例來說，
的。

Remedial

side of a square
For example
女”(female)

部件組合練習 Welcome! AA1
Components combination

請將部件拖曳至正確位置
Please drag the components to the right place

TIME: 0:6

no

詞彙(Phrase): 沒__

拼音(Pinyin): yǒu

注音(Zhuyin): ㄩˇ

Options of the structures

Candidate components of 「有」

Remaining time

Finding out a word from the picture and the phonetic spelling

Multiple Remedial Instruction Material

- Associative Stories of Etymologic
 - ✓ Flash card and the story made leaners remember the word visually.

字圖卡與空間結構 Welcome! AA1
word cards & structures





「有」字是一隻手拿著一塊肉片(「肉」字的部首)。在古代中國，肉是貴重的東西，百姓擁有一片肉時，會認為自己是切切實實地擁有一件東西。

有 depicts a hand holding a meat(the BuShou of 肉). Meat was valuable in ancient China, when someone had a piece of meat, he thought that he really owned something.

第一結構關係: 

部件組合: 十月
radical combination

衍生詞彙: 有關Related; 有些Some

漢字演變圖
the development of Chinese character



Next

Animation of the spatial structure

Supplies and the derived words

Flash card and the story

The animation of the development of the word

Experiment Result

Culture spheres

- The difference in post-test mean of the sinosphere in **EG**, **13.62**, and the non-sinosphere in **EG**, **17.79** are both higher than the sinosphere in **CG**, **3.36** and the non-sinosphere in **CG**, **12.76**.

Culture sphere	Group	Mean		Standard deviation	
		Pre-test	Post-test	Pre-test	Post-test
Sinosphere 漢字 文化圈	EG (n=13)	62.46	→ 76.08	8.550	8.046
	CG (n=14)	61.00	64.36	12.830	12.004
Non- sinosphere 非漢字 文化圈	EG (n=19)	53.84	→ 71.63	10.920	9.599
	CG (n=17)	49.53	62.29	13.408	14.907

Experiment Result

Learning time

- The affect on learners with less than 120 hrs. in **EG**, **21.50**, and those with more than 120 hrs. in **EG** **13.63** are both higher than leaners with more than 120 hrs. in **CG**, **9.40** and those with less than 120 hrs. in **CG**, **8.10**.

Learning time	Group	Mean		Standard deviation	
		前測	後測	前測	後測
Less than 120 hours	EG (n=10)	50.10	→ 71.60	10.734	8.262
	CG (n=10)	49.50	58.90	17.469	20.030
More than 120 hours	EG (n=22)	60.64	→ 74.27	9.251	9.573
	CG (n=21)	57.19	65.29	11.998	8.872

Experiment Result

The analysis of the different remedial instruction in the paper-based post test

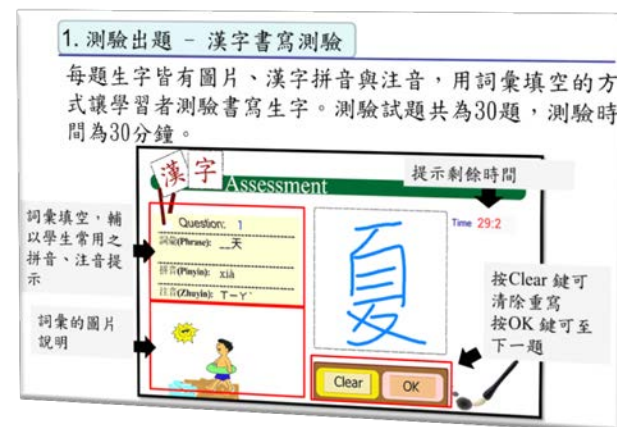
The mean, standard deviation and Independent-Samples t Test

Group	Num.	Mean	Sd.	t	p	η^2
EG	32	77.94	7.152	-3.413**	.001	.163
CG	31	68.94	12.889			

** $p < .01$

Satisfaction Questionary	Average	Sd.
Total avg.	4.323	.538

Scores: 5 is Strongly agree, 1 is Strongly disagree



Conclusion

- CHDMRI provided CFL learners to diagnosis their errors in stroke order, knowledge of Chinese characters, and their understanding of spatial structure.
- The remedial instruction materials offered personalized remedial instruction in accordance with the learners' errors.
- More effective and convenient tools to practice writing Chinese characters correctly.
- The improvement in learning performance of writing Chinese characters was not affected by the time spent learning Chinese or by the background when the CFL learners were beginners.

On The Going Job

- ✓ Deploying at Market





漢字學習與診斷第一課
NTNU etLab - 2014年1月16日
教育

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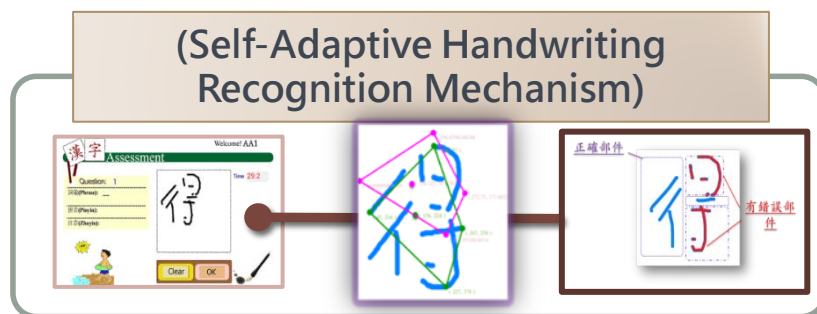
這個應用程式與您的所有裝置都相容。

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- ✓ Taking a patent



- ✓ Free writing
- ✓ Stroke diagnosis
- ✓ Order diagnosis
- ✓ Component diagnosis

THANK YOU FOR LISTENING
