

The Next Steps for Teaching Characters in CFL: Investigating the Effects of Four Character-Teaching Methods on Beginner Learners

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Abstract

This study employs a quasi-experiment design to compare the merits of different CFL teaching approaches in an Irish secondary school. Four groups of beginner learners aged 14-16 were studied for one academic year. Each of four groups was assigned a different teaching approach of focused memorisation (FM), delayed character introduction (DCI), character colour-coding (CCC) or the unity curriculum approach (UC) – which places equal focus on reading, writing, speaking, and listening – for the course of the study.

Two written evaluations were conducted after 14 and 28 weeks of teaching. The current paper reports the participants' results in their recall and recognition of characters, as well as the use of characters in sentences. Results indicate that the methods of FM and CCC have the potential to aid character composition learning,

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while the UC approach may assist the students in learning how to use characters in sentences. This paper offers evidence-based opinions on how future CFL curricula for schools might be shaped. This includes the exploration of a new teaching methodology (encompassing the FM, CCC, and UC approaches), increasing the classroom hours to aid the learning of a new writing system, and a specific assessment - testing overall language acquisition as well as character acquisition - to extrinsically motivate learners.

Keywords: delayed character introduction, character colour-coding, focused memorisation, teaching Chinese characters, unity curriculum

1 INTRODUCTION

Learning Mandarin Chinese is becoming increasingly popular worldwide. China's growing economic and political power (Han, 2014), with over 1 billion Mandarin Chinese speakers worldwide (Ethnologue, 2021), has made the language an exciting choice for many around the world. According to the Ministry of Education, in late 2021 more than 25 million people were learning Chinese as a foreign language (CFL) worldwide (Zou, 2021). While the current study was carried out in Ireland, it was worthwhile to explore trends of teaching CFL in other English-speaking countries worldwide. In Australia, the United Kingdom (UK), and the United States (US), CFL is taught at the primary, secondary, and tertiary levels. While Australia has the longest history of teaching CFL out of these aforementioned countries, Orton (2017) calls for further research in the area of teaching Chinese to native speakers of English and claims that pedagogy and resources are underdeveloped. Out of 617 state secondary schools surveyed in the UK in 2021, 6.3% offer Mandarin as an exam subject while 43% of independent schools surveyed (138) offer it (Collen, 2021). Meanwhile, the popularity of CFL in the US has meant that there is currently an insufficient supply of teachers to meet the demand (Yue, 2017). In 2017, Ireland's then-Minister for Education, Richard Bruton, announced that Chinese would be introduced as a Leaving Certificate subject (equivalent to UK A-levels) under *Languages Connect: Ireland's Strategy for Foreign Languages in Education (2017-2026)* (Department of Education and Skills, 2017). In June 2022, students in Ireland will sit Mandarin Chinese State exams for the first time.

Given the expansion of teaching CFL worldwide, coupled with the fact that Chinese characters are widely thought to be the most difficult aspect of the language to grasp, it is worthwhile to first examine previous research into CFL with a focus on Chinese characters. As the following sections will demonstrate, previous studies tend to focus on recall and recognition of characters as opposed to a more holistic examination of the effects of various teaching approaches.

The goal of this research therefore is to investigate the merits of various teaching approaches in students' learning of Chinese characters and use of characters in sentences. Findings will be used to propose recommendations for CFL courses, including the Leaving Certificate course. In addition, Chinese characters are listed as a named benchmark on the new Chinese Proficiency Grading Standards (Center for Language Education and Cooperation, China's Ministry of Education, 2021) meaning that HSK-oriented programmes will need to urgently reform their curriculum to accommodate this new standard. It is worth noting that other factors encountered through the study have also led to proposals for a CFL curriculum plan, and although this study was carried out in Ireland, the results and discussion can be applied to other CFL programmes worldwide.

2 TEACHING AND LEARNING CHINESE AS A FOREIGN LANGUAGE

Research into teaching and learning Chinese as a foreign language demonstrates the difficulty for beginner learners in acquiring Chinese characters (Shu, 2003; Yang, 2018; Zhang & Lu, 2013). Chinese characters consist of three elements: the sound (phonology); meaning (semantics); and shape (orthography). Although phonetic and semantic elements can provide some information regarding sound and meaning respectively, it is difficult for a beginner learner to know for certain the particular sound or meaning of an unknown character. On the other hand, practising characters can be viewed as a laborious and monotonous task when the typical activity of repeatedly writing is adopted (Kim, 2005; O'Leary & Scully, 2018). Yet, according to Winke and Abbuhl (2007) and Yu (2018), it is still the more commonly used method among both students and teachers.

There also exists the opinion that as a result of modern technologies allowing us to compose written communication it could be considered an inefficient use of a beginner learner's time to practise characters through repeatedly writing them (Allen, 2009). However, when learning to write the characters, a

learner's reading skills are also suggested to improve (Chang et al., 2014; Guan et al., 2011), and so while it may be argued that handwriting Chinese characters is on the decline in everyday life, the benefits of writing characters to both reading and writing skills of CFL learners cannot be ignored.

It is clear from the literature surrounding the teaching and learning of Chinese that the characters are arguably the most difficult aspect for learners, while at the same time they are perceived to be essential for CFL learners to practise and acquire. Although both the awareness of semantic elements and handwriting are deemed important in acquiring Chinese characters, it is also important to consider the effects of various teaching approaches on the curriculum as a whole. As Shen (2014) describes, one of the main challenges in CFL learning is about finding a balance between character learning and overall CFL learning. Similarly, Li (2020) describes that there is a current need for more diversity in research concerning character teaching and learning approaches. In reviewing articles published on Chinese character teaching and learning both in and outside China between 2005 and 2019, Li (2020) noted that the most common topic to research in China was pedagogy and strategies of teaching and learning, whereas outside of China, the topic of CALL (computer-assisted language learning) was most common. Among the papers both in and outside of China related to pedagogy and strategies of teaching and learning, the majority focus on character composition.

The current study therefore more holistically examines the effects of various teaching approaches on character composition and the use of characters in sentences to contribute to the sparse literature in this area. In doing so, the wider CFL curriculum is also considered in the analysis and discussion of this paper.

2.1 Teaching methods and CFL curricula

Native Chinese speakers have their own traditions of teaching characters that include initially focusing on the *character-centred approach*, and then learning to recognise characters and understand the meaning of a text in a *meaning-centred approach* (Lam, 2011). As native speakers know the language before learning

how to write, these approaches cannot be applied to CFL learners with no prior experience of Chinese. Still, Lam (2011) advocates a focus on the character-centred approach for CFL learners. Similarly, a study conducted by Wang et al. (2018) demonstrates the benefits of repetitive character writing for the acquisition of characters in native and non-native speakers of Chinese alike.

In terms of curricula, there are three main types in CFL:

- *Unity*. This focuses on all aspects of learning Chinese including reading, writing, speaking, and listening.
- *Delay*. Teachers refrain from introducing characters for a prolonged period of time and students learn using *pinyin*.
- *Lag*. Students learn using *pinyin* with only a temporary lag in character learning (He & Jiao, 2010).

The current study explores and suggests various teaching approaches for a future CFL curriculum, while the effects of unity and lag type curriculums will also be explored in the UC (unity curriculum) and the DCI (delayed character introduction) groups respectively.

2.2 Teaching approaches adopted in the current research

The study reported in this paper forms part of a larger project investigating CFL in an Irish secondary school. A previous publication from the project (Osborne et al., 2020) focused on how different approaches to teaching affect the *initial* learning of Chinese characters after four and eight weeks. It found that the FM (focused memorisation) group outperformed other groups learning characters in isolation, whereas the CCC (character colour-coding) group was most successful in acquiring character tone.

The present study compares the effect of those approaches over a *longer* time period (after 14 and 28 weeks) in terms of character recall, recognition, and use in writing a free text in Chinese to demonstrate the holistic effects of each approach. As previous research examining the effects of various teaching approaches tends to focus on character form (e.g., Shen, 2005; Shu, 2003; Tan

et al., 2005; Xu et al., 2013), there is a lack of research examining the effects that a teaching approach may have on a student's holistic learning of the Chinese writing system. Thus, the evaluation sections in the current study (discussed in the Methodology section) focus on character knowledge and character use in sentences.

Of the four approaches included in the study, FM focuses most heavily on repetition. Such concentrated study is thought to help learners memorise new items (Dehn, 2008; Randall, 2007). When learners are faced with a new writing system, FM – or an element of FM – can benefit learners despite the fact that it lacks the creativity of other methods (Gifford, 2010; Naka, 1998). As previously mentioned, FM is one of the more popular methods adopted in the CFL classroom among students and teachers alike.

DCI delays the teaching of characters for approximately four weeks (Packard, 1990; Ye, 2013). By learning vocabulary using *pinyin*, students can grasp the basics of the language without being overwhelmed by the new writing system. In Packard's (1990) study, students learning under DCI outperformed a control group in various assessments including sound discrimination and oral skills. On the other hand, a study conducted by Ye (2013) demonstrated that over 75% of CFL teachers and students in the US partaking in the research relayed their support for introducing characters from the initial stages. The main reasons given for this support included the wish to avoid over-relying on *pinyin* in the future as well as the belief that being introduced to characters at an earlier stage could make learning the characters less difficult in the future (Ye, 2013). Although studies in the area of DCI are somewhat lacking, Knell and West (2017) found in their research that students being introduced to characters at an earlier stage compared to another group who had a delayed introduction to characters performed better in character-centred exercises. As a result of the paucity of research concerning DCI, it was included in the current research to compare with FM, CCC, and UC to add to the existing literature.

The addition of colour in teaching and learning is used as a technique to aid memorisation, concentration, and comprehension of a lesson (Dzul kifli & Mustafar, 2013; Jensen, 2008; Winsor, 2009). Online Chinese dictionaries such as *Pleco* and *MDBG* use a colour-coding system whereby each character is represented using a specific colour depending on its tone. Rather than colour coding characters randomly by learners' personal preference, the current study introduced a particular colour-coding system based on the tones, and thus adopted the strategy of commercial online dictionaries. In the current study, characters with tones one to four were written using green, black, blue, and red pens respectively, and neutral tones were represented with a pencil/grey colour. As the evidence for using colour when learning in general is strong, it was worthwhile to investigate any affect using colour had on beginner learners in their memorisation of Chinese characters. Therefore, the study is one of the first to look for empirical evidence for the use of colour in character memorisation.

Finally, UC is based on the current teaching norms of Irish third-level institutions (Osborne et al., 2020). As CFL will not be formally examined in Ireland until June 2022, the university norm was adopted for this research. After analysing the module descriptors and conducting interviews with teachers of these third-level CFL modules, it was found that equal focus was placed on all four aspects of reading, writing, speaking, and listening, therefore encompassing a unity curriculum approach.

Although the primary focus of each group is explicit in the group names, the participants of each group naturally conducted other exercises in the CFL classroom such as cloze tests, translation exercises, and reading comprehensions. However, in all cases, the main focus of each group was specific to that group. For example, the CCC group was not taught via a delayed approach at any stage, nor was the FM group taught using colour-coded characters at any time during the study. A sample teaching plan of each approach can be found in Table 1.

Table 1. Sample teaching plan for each group when introducing characters

	FM	DCI	CCC	UC
<i>Step one</i>	Read <i>pinyin</i> of new words – focus on pronunciation	Read <i>pinyin</i> of new words – focus on pronunciation	Read <i>pinyin</i> of new words – focus on pronunciation	Read <i>pinyin</i> of new words – focus on pronunciation
<i>Step two</i>	Oral translation of new words (focus on <i>pinyin</i>)	Oral translation of new words (focus on <i>pinyin</i>)	Oral translation of new words (focus on <i>pinyin</i>)	Oral translation of new words (focus on <i>pinyin</i>)
<i>Step three</i>	Learn how to write the characters: characters copied from the whiteboard, guided stroke-by-stroke by the researcher, labelling the correct order of the strokes Focused repetition of the characters in the classroom	Read and translate the dialogue from the lesson (in <i>pinyin</i>)	Learn how to write the characters: characters copied from the whiteboard using different colours according to tone , guided stroke-by-stroke by the researcher, labelling the correct order of the strokes	Learn how to write the characters: characters copied from the whiteboard, guided stroke-by-stroke by the researcher, labelling the correct order of the strokes
<i>Step four</i>	Read and translate the dialogue from the lesson (in characters)	Learn how to write the characters: characters copied from the whiteboard, guided stroke-by-stroke by the researcher, labelling the correct order of the strokes Read dialogue (in characters)	Read and translate the dialogue from the lesson (in characters)	Read and translate the dialogue from the lesson (in characters)
<i>Step five</i>	Instructed to study via focused repetitions at home	Instructed to learn characters in their own time (no specific instruction)	Instructed to study using the different colours per character	Complete oral¹ and written exercises² mainly in the classroom Use characters for written exercises

1 Including conversing with others, reading a text aloud, and pronunciation drills

2 Including evaluation exercises, translation exercises, and answering questions using complete sentences

(cont)

<i>Step six</i>	Complete oral and written exercises mainly in participants' own time Use characters for written exercises	Complete oral and written exercises mainly in participants' own time Use <i>pinyin</i> and characters for written exercises	Complete oral and written exercises mainly in participants' own time Use characters for written exercises	Instructed to learn characters in their own time (no specific instruction)
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The following sections present the research design and results that were collected over one academic year. Specifically, the paper addresses the following research questions:

(1) Which of the teaching approaches is more effective for learning Chinese characters in a classroom?

(2) Which of the teaching approaches is more effective for learning the use of these characters in classroom exercises?

3 METHODOLOGY

The study adopted a quasi-experimental research design with convenience sampling. Differing from an experimental design, whereby researchers have complete control over all variables and participants are randomly allocated (Fife-Schaw, 2012), a quasi-experiment is conducted in a practical setting whereby changes may be observed on account of any number of variables (Fife-Schaw, 2012). In this case, it was conducted in an authentic teaching environment in a classroom. This design allows for assessing the effects of various interventions (Fife-Schaw, 2012; Tharenou et al., 2007), such as the teaching approaches of the current research. The participants were not randomly assigned as they were already allocated to a particular class group in their school. In addition, the research design adopted convenience sampling whereby participants are recruited as a result of their convenience (Battaglia, 2008). As the participants of the research were already enrolled in a year of school whereby non-traditional subjects may be studied, i.e., Chinese, the participants were therefore conveniently available to

participate in the study.

To study the effects of the four teaching approaches, four groups of participants were taught by the first author for one academic year under FM, DCI, CCC, or UC. Given the problems associated with learning Chinese characters, it was worth exploring two character-teaching methods against a lag curriculum approach and a unity curriculum approach. Participants' character knowledge and their use of characters in sentences could then be assessed in two summative evaluations. These would reveal which aspects of these approaches were most likely to be effective and suitable to incorporate into a CFL teaching methodology.

As the data was collected before the new HSK 3.0 standards were released, the participants were taught using content from HSK level 1 of the 2.0 version. The HSK, or standardised Chinese proficiency test, comprises six levels. Level 1 is aimed at complete beginners, and the completion of level 6 results in highly competent CFL users. Some CFL textbooks use the HSK levels as a guide to describe the level of their content, while a number of books have also been created specifically to address HSK level content.³ In this way, a lot of work has already been completed to identify content suitable for all learner levels through the HSK programme. This makes it somewhat easier to design content for a specific curriculum. As participants had no prior knowledge of Chinese, the content taught followed the HSK level 1 guidelines.

In terms of assessment, Green (2013) describes the two most common types:

- Educational assessment: whereby progress towards a learning goal and what has been taught is assessed.
- Proficiency assessment: whereby language learning is assessed in relation to a predetermined standard such as the HSK test.

Educational assessment is the focus of this paper as it is the most suitable way to provide recommendations for CFL curricula, that is, through the use of assessments that test previously learned items from course content.

3 For example: New HSK: Complete Vocabulary Lists: Word lists for HSK levels 1, 2, 3, 4, 5, 6

As content and assessment plans appear to be straightforward to develop, this study addresses the effects of the different teaching strategies on CFL beginner learning outcomes related to character knowledge and the use of characters in sentences. This will reveal the elements of these approaches that can potentially develop various skills in learning Chinese.

Each group comprised 22-24 male and female, fourth-year secondary school students in Ireland. The fourth – or transition – year of Irish secondary schools is unique in that it is an optional year for students, though the majority do enrol. Instead of following a set and examined curriculum as in the case of all other years, transition year students are exposed to a number of subjects and courses geared at broadening their horizons before the Leaving Certificate course commences.

These courses may include self-defence, driving lessons, or even mindfulness, to name but a few. The Chinese course of the current study was designed and delivered to this cohort of students, in line with the idea of introducing students to languages they had not previously studied. The students were 14-16 years old, mostly spoke English as their first language, and none had learned Chinese before. For the first summative evaluation, a total of 83 participants were present (20 participants in the FM and UC groups, 21 participants from the DCI group, and 22 participants from the CCC group), whereas in the second summative evaluation, a total of 80 participants were present (20 in each group).

The students were taught Chinese at the beginner level, based on HSK level 1 content from the *New Practical Chinese Reader Textbook 1*, for two one-hour classes a week over 28 weeks. The participants conducted formative evaluations throughout the year so that the researcher could observe student learning progress. However, this paper focuses on just two summative evaluations: one before Christmas (in December) and the other before the summer holidays (in May). Indeed, there is a substantial body of literature regarding learning to read Chinese characters, ranging from behavioural science to neuroimaging studies (Cao et al., 2013; Chang et al., 2014; Tan et al., 2000; Tong & McBride, 2014). These

laboratory-based experiments examined character recognition using carefully chosen character materials which then allowed for statistical measurements of factors such as the stroke number, type, and frequency of characters to be used for analysis. However, the primary focus of the current study is on the learning outcomes in a real-life classroom. In order to capture the authentic features of teaching and learning, the selection of characters is not controlled for variables that are commonly controlled in experimental research. Instead, characters were chosen according to the learning progress made with the textbook in the current study.

Throughout the study, any variable that the researcher could control was kept constant. This included teaching material, teacher, class time, and evaluations. The only variable that purposely differed among the groups was their approach to learning Chinese characters.

The two summative evaluations, of which the content and format were identical for all groups, aimed to identify which approaches contributed to the participants' character knowledge and character use in sentences. The evaluations therefore comprised six sections:

- (1) *Listening dictation; 5 items.* Participants rapidly transcribed the characters from the sounds that were called out by the researcher a total of four times.
- (2) *Recognition; 10 items.* Participants were presented with 10 Chinese words in characters and were asked to transcribe:
 - a. the *pinyin*
 - b. the meaning (i.e., the meaning of the lexical item that was made up of one or more characters)
- (3) *Recall; 10 items.* Participants were required to translate the English words into Chinese characters.
- (4) *Cloze test; 10 items.* Participants were asked to write characters that were missing from an incomplete Chinese sentence.
- (5) *Re-ordering sentences; 6 items.* Participants were presented with three

sentences that had to be ordered correctly as per a conversation.

(6) *Text production; one picture*. Participants described a picture using characters or *pinyin*, and with words in isolation or sentences.

Sections 1, 2, 3, and 6 are primarily designed to examine character knowledge, whereas sections 4, 5, and 6 offer information on the development of skills when using characters in sentences. Section 1 is not reported in this paper, as the recall and recognition sections highlight the most relevant data for character knowledge. Similarly, sections 4 and 5 are omitted, as the text production section provides the richest data for analysing skills of character use in sentences. In each case, participants were allocated 55 minutes to complete the evaluations, and each lexical item provided was rated separately under the marking scheme outlined in Table 2. Where more than one category was required (e.g., *pinyin* and meaning in the recognition section), each item was marked separately. As previously mentioned, the present study focuses on capturing authentic features of teaching and learning practices, meaning that the marking scheme was simplified to evaluate a lexical item as one entity, be it one or two characters.

Table 2. Marking scheme for summative evaluations

Type of answer	Score
Fully correct	2
Partially correct (character/ <i>pinyin</i> /English when asked for character/ <i>pinyin</i> /English)	1
Correct <i>pinyin</i> (when asked for character)	1
Partially correct <i>pinyin</i> (tones/spelling) when asked for character	.5
Incorrect	0
No answer	0

In addition to the summative evaluations, the participants also completed a feedback questionnaire upon completion of the research. The current study reports

feedback from four perspectives:

- (1) Why participants found Chinese challenging.
- (2) Why participants did not feel confident when sitting the evaluations.
- (3) What was most helpful when learning Chinese.
- (4) Suggestions for improvement of a future CFL course.

After 14 weeks of teaching and prior to the first summative evaluation, participants in each group had been introduced to a total of 107 Chinese words (lexical items) and their character(s) that were then tested in various sections throughout the paper. At the time of the second summative evaluation, after 28 weeks of teaching in total, participants had been introduced to a further 106 words, bringing the total to 213 Chinese words (lexical items) and their character(s) that were then tested in various sections throughout the paper.

In the classroom, participants learned these characters according to the approach their group had been assigned. As mentioned previously, the researcher took all necessary steps to ensure that the only variable that differed amongst the groups was the way in which the characters were learned by the participants. All groups were first introduced to the pronunciation of a new Chinese word, after which the researcher guided the class step-by-step through the character's stroke order (see Table 1).

Participants of the FM group then completed guided FM in class and written exercises for homework. As the DCI, CCC, and UC groups did not specifically focus on repetition, students of these groups learned the characters for homework and completed written exercises in class. The introduction of characters in the DCI group was delayed for four weeks, meaning that written exercises were first conducted using *pinyin*, with characters introduced after four weeks. CCC used the colour-coded scheme for written exercises and when practicing characters. The UC group focused on reading, writing, speaking, and listening, and did not receive specific instruction as to how to learn the characters at home. Table 3 demonstrates the tasks and implementation of each teaching approach. In line with the research

design, the only differences observed in the teaching approaches are in relation to how participants dealt with the characters (both in the classroom and homework tasks), while all other variables were kept constant.

Table 3. Tasks and implementation of each method

	FM	DCI	CCC	UC
<i>In-class tasks</i>	Learning new words by repetition.	Focus on <i>pinyin</i> and the meaning of new words before characters introduced.	Learning new words through colour.	Learning new words without specific instruction.
	Reading and translating dialogues.	Reading and translating dialogues.	Reading and translating dialogues.	Reading and translating dialogues.
	Conducting written, oral, and listening exercises.	Conducting written, oral, and listening exercises.	Conducting written, oral, and listening exercises.	Conducting written, oral, and listening exercises.
<i>Homework tasks</i>	Learning characters by repetition.	Learning characters.	Learning characters using colour.	Learning characters.
	Conducting written exercises.	Conducting written exercises (in <i>pinyin</i> and characters).	Conducting written exercises.	Conducting written exercises.
<i>Dealing with characters</i>	Repetition.	Delay.	Colour-coding.	Unity curriculum.
	Testing by writing without prompt.	Memorising <i>pinyin</i> and meaning before associating with characters.	Each character represented by a different colour according to tone.	Equal focus on reading, writing, speaking, and listening.
<i>Hours spent learning per week</i>	Two one-hour classes with the researcher.	Two one-hour classes with the researcher.	Two one-hour classes with the researcher.	Two one-hour classes with the researcher.

4 RESULTS

This section begins by outlining the results of the first and second summative evaluations according to the sections testing character knowledge and character use in sentences. It is worth noting that in all cases, participants provided a variety of answers, for example: correct characters; correct *pinyin*; partially correct characters, among many others. For concision, this section will show the percentage of fully correct answers (characters), correct *pinyin*, as well as incorrect and blank answers in the tables. Firstly, character knowledge will be analysed followed by an examination of character use in sentences. After this, results from the feedback questionnaires will be examined.

4.1 Character knowledge

As discussed in the Methodology, the components of the evaluations that examine character knowledge are:

- character recognition.
- recalling characters.
- text production.

Table 4 demonstrates the percentage of answers achieved by each group in these sections in the first summative evaluation (*SE1*) and the second summative evaluation (*SE2*). Firstly, participants found it difficult to provide fully correct answers (correct meaning and correct *pinyin*) when 10 Chinese lexical items and their characters were presented, as displayed in Table 4. Despite providing no correct answers in the first evaluation, the FM group increased this rate of correctness to 1.5 percent in the second evaluation.

On the other hand, although the CCC and UC groups obtained higher results than the others in *SE1*, their results *decreased* in *SE2*. Yet, the CCC group attained the highest percentage of correctness in both evaluations. Aside from DCI, all groups decreased their rate of incorrect answer percentages from the first to second summative evaluation.

In recognising characters, the CCC and FM groups performed better than DCI and UC. This may suggest that these two groups could more easily recognise characters based on the unique characteristic of their given teaching methods, that is, the use of colour for CCC and the use of focused memorisation in FM.

Table 4. Percentages of character recognition answer categories in the first and second summative evaluations

	Correct meaning and <i>pinyin</i>		Incorrect		No answer	
	<i>SE1</i>	<i>SE2</i>	<i>SE1</i>	<i>SE2</i>	<i>SE1</i>	<i>SE2</i>
<i>FM</i>	0	1.5	55	52.5	45	39
<i>DCI</i>	0	0	33	34	64	64
<i>CCC</i>	5	3.5	39	37	54	55.5
<i>UC</i>	1	0	59	48	36	47

Table 5 shows again that the FM and CCC groups stand out, this time in providing the correct characters of 10 English words provided. These groups successfully increased their percentages from the first to second evaluation. Although the FM group demonstrated a larger percentage increase from zero percent to 6.5 percent, the CCC group actually scored higher in SE1 with 6 percent of correct answers. On the other hand, the DCI and UC groups performed worse in the second evaluation. Although all groups reduced their percentage of incorrect answers, the FM group is the only group that decreased its percentage of blank answers.

Table 5. Percentages of character recall answer categories in the first and second summative evaluations

	Correct characters		Correct <i>pinyin</i>		Incorrect		No answer	
	<i>SE1</i>	<i>SE2</i>	<i>SE1</i>	<i>SE2</i>	<i>SE1</i>	<i>SE2</i>	<i>SE1</i>	<i>SE2</i>
<i>FM</i>	0	6.5	0	2	51	49	45	32
<i>DCI</i>	1	0.5	0	4	27	23	65	66

(cont)

CCC	6	6.5	5	1	36	33	45	49
UC	5	0	0	3.5	51	39	38	49

There was also a tendency of the groups to answer using *pinyin*, presumably when the sounds could be remembered but the characters could not. Indeed, it is likely that recalling the characters from memory is more difficult than remembering the meaning and pronunciation, thus a probable reason for the occurrence of *pinyin* in participant answers. CCC is the only group that reduced their percentage of correct *pinyin*, which may suggest that where other groups preferred to use *pinyin*, the CCC group demonstrated a preference in using characters and could therefore provide an increase in the percentage of correct characters.

As a result, it can be seen that the FM and CCC groups performed better at recalling characters when the English meaning is provided. As in the character recognition section, these groups demonstrated a better awareness of character shape compared to other groups which could be linked to the teaching methods of FM and CCC.

Table 6 first displays the number of correct Chinese words in characters and *pinyin* of the text production section. As there was no limit to the number of words the participants could provide when describing a picture, category percentages in relation to overall words supplied per group are also highlighted in brackets.

In the case of the ‘all incorrect’ and ‘no answer’ columns, both the number and percentage of participants per group who answered this way are provided. The biggest increase in both number and percentage of correct characters is seen in the FM group, followed by the CCC group. The CCC and UC groups managed to decrease the number and percentage of participants providing only incorrect characters, whereas the DCI group kept this column at zero in both cases. In relation to participants not attempting to answer this section, the UC group was the only group to decline from SE1 to SE2, whereas all other groups saw an improvement in attempts.

All groups increased the number of words written in *pinyin*, which may again suggest that beginner learners of CFL prefer to use *pinyin* when the characters of Chinese words cannot be recalled. In this section, it once more appears that the FM and CCC groups were comparatively better than other groups, this time in describing a picture using characters.

Table 6. The number and percentage of words in various answer categories for text production in the first and second summative evaluations

	Correct characters		Correct <i>pinyin</i>		All incorrect		No answer	
	SE1	SE2	SE1	SE2	SE1	SE2	SE1	SE2
FM	46 (44%)	158 (56%)	12 (12%)	18 (6%)	1 (5%)	1 (5%)	6 (30%)	3 (15%)
DCI	27 (29%)	38 (25%)	12 (13%)	22 (14%)	0 (0%)	0 (0%)	8 (38%)	6 (30%)
CCC	29 (28%)	113 (48%)	19 (18%)	24 (10%)	1 (5%)	0 (0%)	5 (23%)	3 (15%)
UC	42 (29%)	95 (38%)	16 (11%)	22 (9%)	2 (10%)	0 (0%)	1 (5%)	5 (25%)

In all character knowledge sections of SE1 and SE2 reported in this paper, both the FM and CCC groups scored comparatively higher. As the biographical questionnaires (completed upon commencement of the project) indicated a mix of ability and learning styles in each group, it is quite possible that the specific teaching methods of the FM and CCC groups had a positive influence on their respective learning outcomes.

Given the relatively small difference in correct answers provided in the character knowledge sections, it was worth examining the difference in scores achieved by each group in SE1 and SE2 for statistical significance. For this, the scores of the individuals in each group (corrected as per the marking scheme in Table 2) were used. It is worth noting that for all statistical tests reported, the assumptions for parametric tests were violated, and so nonparametric tests were used. Firstly, a Kruskal-Wallis test was conducted (SE1 M=0.99, SD=4.37 and SE2 M=1.02, SD=3.34) and showed that there was no statistically significant difference in means among the groups for either recognition section ($H(3)=6.28, p=.099$ in

SE1, and $H(3)=4.51, p=.212$ in SE2).

A Friedman test was then conducted to examine any difference in means of the recognition sections from SE1 to SE2. Table 7 demonstrates that in the recognition sections of SE1 and SE2, a statistically significant difference does not appear to exist between the scores of the groups ($F(1)=1.485, p=.223$).

Table 7. Friedman test to examine difference in score between SE1 and SE2 (recognition)

Ranks	
	Mean Rank
SE1 Recognition Score	1.46
SE2 Recognition Score	1.54

Test Statistics ^a	
N	94
Chi-Square	1.485
df	1
Asymp. Sig.	.223

a. Friedman Test

Next, another Kruskal-Wallis test (SE1 $M=1.05, SD=3.13$ and SE2 $M=1.17, SD=2.59$) found no statistically significant difference in means between the groups for either recall test ($H(3)=7.19, p=.066$ in SE1, and $H(3)=1.56, p=.669$ in SE2).

A Friedman test was then conducted to examine any difference in means of the recall sections from SE1 to SE2. Table 8 shows that a statistically significant difference does appear to exist between the scores of the groups ($F(1)=8.022, p=.005$).

Table 8. Friedman test to examine difference in score between SE1 and SE2 (recall)

Ranks	
	Mean Rank
SE1 Recall Score	1.40
SE2 Recall Score	1.60

Test Statistics ^a	
N	94
Chi-Square	8.022
df	1
Asymp. Sig.	.005

a. Friedman Test

4.2 Character use in sentences

The text production section tested skills of using characters in sentences through examining participants' ability to describe a picture using only sentences. Although all groups showed a decrease in providing only sentences, the UC group was most consistent in writing only sentences across the two evaluations.

The trend in Table 9 shows that in all groups, the use of both words and sentences decreased – except for the UC group where an increase was observed – whereas the use of words only increased for all groups. This is not too surprising given the fact that the participants of the FM, DCI, and CCC groups all focused on the characters in their respective classes, whereas UC did not focus on characters specifically. As such, UC appears to be the strongest out of all groups in the ability to describe a picture without using words in isolation.

Table 9. Percentages of words only, sentences only, and mix of both for text production in the first and second summative evaluations

	Words only		Sentences only		Mix of words and sentences	
	<i>SE1</i>	<i>SE2</i>	<i>SE1</i>	<i>SE2</i>	<i>SE1</i>	<i>SE2</i>
<i>FM</i>	62	88	15	0	23	12
<i>DCI</i>	54	86	31	0	15	14
<i>CCC</i>	43	65	19	6	38	29
<i>UC</i>	41	47	47	20	12	33

However, Table 9 does not differentiate between the use of characters and *pinyin*. The UC group did not exclusively use characters to write the sentences. A more accurate depiction of participant ability can be identified through an examination of the percentage of participants who used characters to write sentences only in Table 10. In this case, the FM and CCC groups were the only groups whereby one participant in each group was able to describe a picture in SE1 and SE2 respectively using only characters and only sentences. The FM and CCC groups show more promise in using characters to describe a picture using only sentences, yet the UC group displays a development of language acquisition skills through the use of both characters and *pinyin* to describe a picture using only sentences. This is unsurprising given the UC participants' equal focus on reading, writing, speaking, and listening over the course of the study, and suggests that sufficient guidance in and focus on learning characters is required in order to be able to reproduce them, despite any overall language acquisition skills a group may have.

Table 10. Number and percentage of participants per group using only characters to write only sentences to describe a picture in the first and second summative evaluations

	Sentences only using only characters	
	SE1	SE2
FM	1 (5% of group)	0 (0% of group)
DCI	0 (0% of group)	0 (0% of group)
CCC	0 (0% of group)	1 (5% of group)
UC	0 (0% of group)	0 (0% of group)

In order to examine the observations of the text production section further, a Kruskal-Wallis test was computed to assess the effect of a teaching approach on the number of words in characters supplied by each group in the text production section of the evaluations (SE1 M=1.53, SD=3.13 and SE2 M=4.3, SD=7.77). Table 11 demonstrates that there does not appear to be a significant relationship between the teaching approach of each group and the number of words in characters provided by each group in the text production sections of the first and second summative evaluations ($H(3)=2.43$, $p=.488$ in SE1, and $H(3)=3.53$, $p=.317$ in SE2). As many other variables exist in a quasi-experimental study, it is worth noting participant feedback that demonstrated the difficulty of learning Chinese for the participants, which may have also affected these results.

Table 11. Kruskal-Wallis test between teaching method and number of words provided in text production section of the first and second summative evaluations

Ranks			
	Teaching Method	N	Mean Rank
SE1 TPI Score	FM	23	51.76
	DCI	23	42.67
	CCC	24	45.75
	UC	24	49.79
	Total	94	

(cont)

SE2 TPI Score	FM	23	51.46
	DCI	23	38.98
	CCC	24	50.25
	UC	24	49.13
	Total	94	

Test Statistics ^{a,b}		
	SE1 TPI Score	SE2 TPI Score
Kruskal-Wallis H	2.429	3.530
df	3	3
Asymp. Sig.	.488	.317

a. Kruskal Wallis Test

b. Grouping Variable: Teaching Method

It was also worth examining whether or not there was a significant increase in the number of words (in characters) provided by each group from SE1 to SE2. Table 12 demonstrates that after conducting a Friedman test, a statistically significant increase exists between the number of words (in characters) provided in SE1 and SE2 ($F(2)=34.7, p=.000$). Furthermore, a Wilcoxon signed-rank test with a Bonferroni correction applied (resulting in a significance level set at $p<0.025$) shows that the number of words in the text production section did change significantly from SE1 to SE2 ($Z=-4.182, p=.000$), suggesting that the participants were better able to describe a picture using more Chinese words (in characters) at the time of SE2, compared to the time of SE1.

Table 12. Friedman test to examine difference in number of words provided in SE1 and SE2 (text production)

Ranks	
	Mean Rank
SE1 TPI Score	1.36
SE2 TPI Score	1.64

(cont)

Test Statistics ^a	
N	94
Chi-Square	15.511
df	1
Asymp. Sig.	.000

a. Friedman Test

4.3 Feedback from participants

In the feedback questionnaire presented to students at the end of the study (consisting of yes/no and open-ended questions), 90 percent of participants found Chinese challenging with the main reason being due to a variety of unique characteristics of the Chinese language, e.g., the characters. Approximately 70 percent stated that they did not feel confident when sitting the evaluations, with difficulties in learning the language again being a main reason for this.

In terms of what was deemed to be helpful to participants in their learning, the characters and online resources were the more popular answers, which shows that although characters are usually deemed to be one of the more difficult aspects of learning Chinese, it is apparent that the participants believed that their overall learning benefitted from both learning and increased exposure to the characters. It is worth noting that online resources included recall and recognition apps, where participants had to match characters to the *pinyin* or meaning and vice versa, demonstrating even more focus on and exposure to the characters.

When participants were asked to write suggestions for improving the CFL course, the majority of answers in all groups stated that to improve the course, the structure of the class should be altered to include more culture, group work, and class time, with less content delivered at a slower pace. Interestingly, participants felt that they needed more time to learn Chinese and believed that it was not suitable for their year of study, presumably because of its unique set-up as previously discussed in this paper.

5 DISCUSSION

Due to the difficulty of learning CFL, as well as a lack of necessary research examining the effectiveness of various teaching approaches on students' character knowledge and character use in sentences, the current research was undertaken in order to address the gap in the literature with the intention of providing recommendations for a future CFL curriculum. In order to supply these recommendations, the following discussion focuses on the teaching approaches more suited to character knowledge and character use (in sentences), before a future CFL curriculum is discussed. Specifically, the research questions are addressed, which are:

- (1) Which of the teaching approaches is more effective for learning Chinese characters in a classroom?
- (2) Which of the teaching approaches is more effective for learning the use of these characters in classroom exercises?

5.1 Addressing the research questions; teaching methodology recommendation

In the current research, statistical evidence shows no significant difference between groups in each evaluation, however an overall significant difference was found *between* the two evaluations in the recall and text production sections. As the FM and CCC groups outperformed the DCI and UC groups, these findings suggest that a combined method of FM and CCC could enhance beginner character knowledge skills, however further research in examining this combined method is needed.

From the feedback questionnaires, it was found that characters were the reason many participants found Chinese challenging, however learning the characters was also thought to be one of the more helpful tasks. It therefore suggests that introducing a specific character-teaching method for beginner learners might keep them motivated to learn a new writing system, provided that

attention is also paid to content that students enjoy, or feel is necessary, such as cultural information. In addition, this provides further support that the learning of characters can actually aid a beginner learner's acquisition of CFL as highlighted in previous research (e.g., Chang et al., 2014; Guan et al., 2011).

FM is a method that has received some criticism (e.g., Dimmock, 2000; O'Leary & Scully, 2018) despite seeming to be useful in the current study. Indeed, essential skills and techniques cannot be put aside because they are time-consuming or labour-intensive – a certain level of repetition is needed, at least at the beginning stages of learning Chinese. However, steering away from the one-size-fits-all approach to teaching (Adamson, 2004), it is seen that a combination of FM and CCC could be more beneficial than one method alone. Through the addition of colour when repeatedly writing with FM and CCC, an element of creativity can be introduced which could eliminate the ineffective or monotonous nature of FM and hold the learner's attention for longer. As the particular colour-coding system was based on the tones of characters – as in the case of online dictionaries –, an additional benefit is that the tones of characters learned would become very familiar to students through this method, however, the transferring of phonetic information to the orthographical level was not assumed in the research.

It is worth noting that the lag curriculum in the DCI group does not show any positive effect on learning CFL in terms of character use in sentences or character knowledge, while DCI participants also had one of the highest rates of answer stating that Chinese was a difficult language to learn in the feedback questionnaires. Therefore, DCI cannot be recommended as a curriculum plan to teach CFL to beginner learners based on the current research.

In the case of the UC group, it has been documented that some benefits exist to this approach in terms of using characters in sentences. But UC alone cannot be used to develop all four skills of reading, writing, speaking, and listening; it must be used with a particular character-teaching method as highlighted, and in the context of content that the students might value.

It is interesting to note that in the text production section, although the UC group had the highest percentage in writing only sentences, one participant from each of the FM and CCC groups managed to describe a picture by writing sentences exclusively using characters. Therefore, the UC group showed overall acquisition skills here, whereas the FM and CCC groups were able to demonstrate skills in the use of characters to create sentences. As a result, it is possible that a combination of FM, CCC, and UC could aid future students in their holistic learning of CFL. For example, character knowledge could be developed by the previously described combined FM and CCC methodology, whereas exercises encompassing all four skills of reading, writing, speaking, and listening (in the UC approach) could allow for the development of language acquisition skills. Further research adopting this combined methodology must first be conducted before it can be fully recommended.

In the Results section of this paper, it was found that a statistically significant difference exists in the scores obtained by each group for the recall sections from SE1 to SE2. Similarly, in the text production section whereby participants could write freely and without parameters, a statistically significant increase in scores was observed in the number of words provided by each group from SE1 to SE2. This is particularly interesting for the FM and CCC groups, whereby the increase in words observed across SE1 and SE2 was the largest (111 words and 83 words respectively), meaning that their assigned teaching approaches may have influenced their relatively high recall of characters in the long term. In order to examine whether there was a difference between the scores of SE1 and SE2 *within* each group, a Wilcoxon signed-rank test was conducted. The Wilcoxon signed-rank test demonstrated (see Table 13) that between SE1 and SE2 (approximately five months apart), no statistically significant change was observed in scores of the recognition section ($Z=-.458$, $p=0.647$) or the recall section ($Z=-1.488$, $p=0.137$). However, a statistically significant change was noted in the number of words provided in the text production section ($Z=-4.182$, $p=0.000$). It

is worth noting that while mostly ties were observed for each section on the tests (recognition: 61, recall: 49, text production: 47), more positives than negatives were observed respectively (recognition: 20-13, recall: 32-13, text production: 37-10).

Table 13. Output generated from Wilcoxon signed rank test when examining difference between the scores of SE1 and SE2 within each group

Ranks				
		N	Mean Rank	Sum of Ranks
SE2 Recognition Score - SE1 Recognition Score	Negative Ranks	13 ^a	19.62	255.00
	Positive Ranks	20 ^b	15.30	306.00
	Ties	61 ^c		
	Total	94		
SE2 Recall Score - SE1 Recall Score	Negative Ranks	13 ^d	29.73	386.50
	Positive Ranks	32 ^e	20.27	648.50
	Ties	49 ^f		
	Total	94		
SE2 TPI Score - SE1 TPI Score	Negative Ranks	10 ^g	16.95	169.50
	Positive Ranks	37 ^h	25.91	958.50
	Ties	47 ⁱ		
	Total	94		

a. SE2 Recognition Score < SE1 Recognition Score

b. SE2 Recognition Score > SE1 Recognition Score

c. SE2 Recognition Score = SE1 Recognition Score

d. SE2 Recall Score < SE1 Recall Score

e. SE2 Recall Score > SE1 Recall Score

f. SE2 Recall Score = SE1 Recall Score

g. SE2 TPI Score < SE1 TPI Score

h. SE2 TPI Score > SE1 TPI Score

i. SE2 TPI Score = SE1 TPI Score

Overall, the findings observed in the current study demonstrate that the two groups being taught under methods that focus specifically on character knowledge (FM and CCC) performed comparatively better in character-centred exercises. Similarly, the group being taught under the UC approach, encompassing equal focus on all skills of reading, writing, speaking, and listening, demonstrated success in forming sentences in the evaluations.

In their feedback, the UC group participants stated that they did not believe learning characters was helpful to their learning. The group also provided the highest percentage of answers advocating different methods to teach CFL, demonstrating that learning the characters was a clear obstacle for the UC group. Interestingly, not only were the FM and CCC methods shown to be effective in developing character knowledge skills, but they also feature in the sections targeted to test the use of characters in sentences. Therefore, it is possible that future beginner learners could develop skills of character knowledge and character use in sentences under an integrated teaching methodology of FM, CCC, and UC.

5.2 Assessment recommendations

There are two main recommendations for the type of assessment in a future CFL curriculum. Firstly, the participants suggested the introduction of a certificate upon completion of the course. It was noted throughout the year that the motivation of the participants decreased as time went on. As such, the first author implemented a rewards system that motivated participants again. In the proposed Leaving Certificate CFL course, students will work to achieve the highest grades possible to secure their next step of education. Motivation should therefore not be a major issue if the assessment taken by the future students has a real impact on their future education or career in terms of extrinsic motivation, while content aligned to the students' interest would also help to stimulate their intrinsic motivation. Secondly, the assessments of the current study focused on the skills of character knowledge and character use in sentences. As a result, the evaluations did not attempt to assess overall language acquisition skills of participants as this was not the focus of the

study. For future assessments of a CFL curriculum, it is proposed that both the writing system and language acquisition skills are tested in various sections. These exercises testing language acquisition may include:

- reading comprehensions with questions in English and Chinese.
- information gathering through listening exercises.
- oral assessments.

In implementing exercises such as these, future students can be tested in all areas of both character and language acquisition.

5.3 Class time recommendations

As the study collected data on each group's language skills and attitudes towards learning CFL, we can give further insights to their experience of learning CFL from the beginner level under the various approaches.

Firstly, participants believed that there was too much content to learn, that they did not have sufficient time to learn the content, and that they felt underprepared when sitting the evaluations. Although the researcher used a textbook aimed at beginner learners and in line with the introductory Chinese proficiency test (HSK 1), the research only warranted two hours of class time per week per group. In total, the participants learned CFL for 56 hours in the academic year, meaning that over a two-year course they would have received 112 hours of in-class instruction. In the case of Ireland, a foreign language taught in the final two years of secondary school warrants a total of 180 hours (Curriculum Online, 2019), which is considerably more than the current study. It is likely that the issue reported by participants referred to the amount of time allocated to teaching in the classroom, rather than the content.

Additionally, students will also likely require more contact hours for CFL on account of learning a new writing system. If a combined methodology of FM, CCC, and UC is implemented in the curriculum, then students will need at least four hours per week to learn CFL, with two hours per week aimed at implementing FM and CCC, and a further two aimed at implementing UC.

Increased hours could allow for the combined methodology to be implemented while also providing more time for future students to be taught in the classroom (224 hours). Although this recommendation warrants further research, it is clear from this study that beginner learners need to be in the classroom for more than two hours per week.

6 CONCLUSION

Adamson (2004, p. 604) defines a teaching method as a ‘single set of practices and procedures, derived from theory or theorisation of practice, that impinges upon the design of a curriculum plan, resources, and teaching and learning activities’. However, there is no single best practice (Lam, 2011; Liu & Shi, 2007). Adamson (2004) advocates abandoning the search for one best method and argues that teachers should become ‘principled eclecticists’ – masters of various skills that can be used in different contexts according to the needs of learners. This eclecticist approach may be particularly useful for CFL teachers. Chinese is certainly deemed to be one of the most difficult foreign languages to study as students must learn and master a large number of characters (see Osborne, 2016; Osborne et al., 2020). Given the complexities of the Chinese writing system in terms of meaning and pronunciation, teachers should be able to draw upon a range of practices and procedures for effective learning experiences and outcomes.

Previous literature has demonstrated that although research has been conducted to investigate various learner strategies and teaching approaches concerning character knowledge, there is a certain lack of research regarding the effects of different teaching approaches on a student’s character knowledge learning and their use of characters in a sentence. The current study therefore used four approaches in four different groups (FM, DCI, CCC, and UC) in order to examine any potential positive effects these had on the participants’ learning of character knowledge and using characters in sentences. Results from the current research suggest that the methods of FM and CCC have the potential to positively

impact a student's learning of character knowledge, whereas UC may have a positive effect on their learning of using characters in sentences. In addition, DCI did not demonstrate any positives for the participants' character learning in the current study. Therefore, it is possible that a combined methodology of FM and CCC (to assist character knowledge learning) as well as UC (to assist learning to use characters in sentences) could collectively aid learners in their study of Chinese characters. Nevertheless, further research should be conducted to examine the effectiveness of the newly proposed combined teaching methodology in a study similar to the one described in the current research. This could further interrogate the proposed recommendations for future CFL curricula, as well as add to the sparse literature.

The current study is not without limitations. Although efforts were made to control all other variables (e.g., textbook, teaching hours, etc.), there may have been factors that affected results and were not monitored due to the nature of a quasi-experimental research design. For example, the participants' independent learning time was extremely difficult, if not impossible, to control. In addition, the simplification of the marking scheme – despite being a common pedagogical practice in a real-life foreign-language classroom due to the volume of tests that are normally involved in a year-long course – did not differentiate between the learning of a monosyllabic word and a disyllabic word. For future research, especially for lab-based experiments, a fine-grained marking scheme would be needed to reflect this difference. However, the value of the research is that it was situated in a context of an authentic classroom, and the findings are applicable to similar contexts of teaching and learning.

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中文外语教学中的汉字教学展望： 四种汉字教学方法对初学者的影响

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摘要

在过去的几年中，中文外语教学（以下简称 CFL）在世界范围内大为普及。尽管汉字被认为是中文学习的主要困难之一，但针对各种教学方法对汉字学习所产生影响的研究依然匮乏。本研究采用准实验设计，比较了应用于爱尔兰中学学习者中不同教学方法的优缺点，四组 14-16 岁的初学者参与了一个学年的实验研究。每组分别应用不同的教学方法，分别为专注记忆（FM），延迟汉字学习（DCI），汉字颜色编码（CCC），以及在学习过程中将关注力均匀分布给听说读写四个技能的统一课程方法（UC）。然后分别在授课 14 周和 28 周后进行了书面评估。本文展示了参与者在回忆和识别汉字方面的成效，以及汉字在语句中的运用。结果表明，FM 和 CCC 的方法可能会帮助汉字书写的学习，而 UC 的方法可能会帮助学生如何学习如何在句子中使用汉字。在完成一个学年的课程后，以问卷形式收集的参与者反馈也表明，汉字确实是学习中的难点。本文就未来的汉语外语课程设置提供了基于实证研究的建议，包括对新的教学方法（融合了 FM, CCC 和 UC）的探索，增加课堂时间以帮助学习汉字书写系统，并利用专门针对整体语言习得和汉字习得的测试来外在激励学习者。

关键词：延迟汉字学习 汉字颜色编码 专注记忆 汉字教学 统一课程方法

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