

Project Title : Foundational Chinese literacy skills for non-Chinese speaking (NCS) students: An intervention research

Grantee : The Chinese University of Hong Kong

Principal Investigator : WONG Yu-ka, Gary
Department of Curriculum and Instruction
The Chinese University of Hong Kong

Final Report

by

Principal Investigator

Foundational Chinese Literacy Skills for Non-Chinese Speaking (NCS) Students: An Intervention Research

Abstract

The study aimed at enhancing the effectiveness of the Chinese-as-a-second-language (CSL) literacy instruction, namely Foundational Chinese Literacy Skills Instruction, provided to Hong Kong non-Chinese speaking (NCS) students by implementing an intervention research in five primary schools. The project lasted for two years during which time the Chinese literacy development of approximately 200 senior-primary NCS students (designated into the treatment or control groups) from five schools was investigated. The results were reported in two phases as Study 1 and 2. In Study 1, a total of 268 third-grade students—222 NCS students and their 46 native Chinese-speaking classmates—were evaluated using a range of Chinese language assessments. The results revealed that the CSL students' (1) performance was significantly lower than that of their native-speaker counterparts, particularly in Chinese reading and spelling, and (2) Chinese orthographic, phonological, and morphological awareness significantly contributed to their Chinese reading and spelling proficiencies. In Study 2, 97 students of the treatment group and 102 students of the control group were assessed again after a school year. The students performed better on all measures, as shown by statistically significant *t*-test values, except spelling after a year. Results of analysis of covariance showed that, controlling for pre-test attainments, students of treatment group gained greater improvement than those of control group in all competences except phonological awareness. The findings supported the effectiveness of

the intervention in developing the NCS students' Chinese character reading and spelling by promoting their metalinguistic awareness.

Keywords: Chinese-as-a-second-language (CSL) learning and teaching; Hong Kong non-Chinese speaking (NCS) students; Foundational Chinese literacy skills; Intervention research

Introduction

The acquisition of literacy skills is one of the major tasks of early schooling: children are normally fluent in their native oral language but do not know how it is represented in writing. Learning to read lays the foundation for life-long development of reading and writing skills, which are important for success in school and life. In view of this, many research studies have been conducted to improve early literacy instruction. The need for deeper understanding of the literacy acquisition process is even more acute in the field of second language learning. Firstly, variations in the acquisition process and attainment levels of second language learners are much greater than those of native learners (Aarts & Verhoeven, 1999). Secondly, for immigrant-learners learning the dominant second-language, the quality of literacy instruction influences their social integration and advancement (August & Shanahan, 2008).

This is also true for non-Chinese speaking (NCS) ethnic minority children who are learning Chinese-as-a-second-language (CSL) in Hong Kong. Their attainment and proficiency in Chinese language and literacy are unsatisfactory and have aroused much social concern (Wong & Shiu, 2009). Moreover, this unsatisfactory attainment has had a detrimental effect on their academic advancement and social integration (Loh & Tam, 2016). NCS students in both primary and secondary schools either performed poorly in literacy tasks or had a low opinion of their own reading and writing skills (Ku et al., 2005; Loper, 2004; Wong & Shiu, 2009). While some NCS students have claimed that Chinese language instruction in school is poor (Ku et al., 2005; Loper, 2004), some Chinese language teachers have also admitted that they find CSL teaching a challenge and would like to receive more professional support (Hong Kong Unison & Hong Kong Professional Teachers' Union, 2007). More studies are needed to deepen our

understanding of students' Chinese literacy development and to facilitate CSL learning and teaching in the classroom.

Aiming at developing and evaluating an instructional approach that promotes the Chinese literacy attainments of NCS students, the study was conducted on the knowledge base supported by the findings of extant research on both CSL and native Chinese-speaking learners' literacy development (e.g. Shum, Ki, & Leong, 2014 and Yeung, Ho, Chan, Chung, & Wong, 2013b, respectively), including the findings of the Principal Investigator's (PI) longitudinal study of local primary NCS students (Wong, 2017a, 2017b) and a survey study on their Chinese teachers' instructional practices (Wong, 2016b). Conducted with consideration of the Chinese language's characteristics, most of which are difficult for CSL learners, these research studies have identified some crucial linguistic component skills, e.g. orthographic and syntactic skills, which are influential in Chinese literacy development and may have a high pedagogical value. In the following, the identified component skills will be deliberated, preceded by an account of Chinese linguistic characteristics, and the proposed instructional approach.

Review of literature of the project

Chinese linguistic characteristics

Differing from alphabetic languages, Chinese is morpho-syllabic, with Chinese characters as its basic units. Each Chinese character is a two-dimensional, visual-spatial unit that mostly stands for a syllable and functions as a morpheme representing certain meanings (Cheung, McBride-Chang, & Chow, 2006). Given the comparatively limited number of

syllables, Chinese assigns tones to each syllable to differentiate lexical and grammatical meanings, which most CSL learners of non-tonal native languages find it difficult to learn (Liu, 2002). Another characteristic of Chinese language is that it is non-inflectional and, unlike alphabetic languages such as English, has no morphological transformation to express grammatical relationships and meanings. Instead, this linguistic information is conveyed by arrangements of word order and uses of function words like the auxiliaries 的 (dik1, used as an adjective or possessive marker)¹, 了 (liu5, used to indicate completion of action), and the preposition 把 (baa2, used to bring an object before its corresponding transitive verb) (Lü, 1980).

The greatest difficulty of CSL learners comes from acquiring the unique and complex Chinese writing system (Shen, 2005). Chinese characters have complex structural properties that can be categorized as formal and functional (Li, 2007). The formal properties refer to graphical-structural components and their relationships, while the functional properties refer to the ways in which these components represent the pronunciations and meanings of the language. According to Su (2001), among the currently used characters, the majority of 96% are compound characters that have more than one radical, as against one-radical simple characters. As for the functional properties of the characters, approximately 80% to 90% of compound characters are ideo-phonetic compounds (Cheung et al., 2006; Kang, 1993; Li & Kang, 1993) composed of a semantic radical that cues its meaning and a phonetic radical that cues its pronunciation. For example, the compound character 晴 (/cing4/, sunny) is of left-right structure and consists of two components: 日 (/jat6/, 'sun') and 青 (/cing1/, 'green').¹ The component 日 indicates the related meaning of the character (i.e. 'sun - sunny') and the component 青 cues the sound

(i.e. /cing4/ – /cing1/). However, neither the semantic nor phonetic information conveyed in an ideo-phonetic compound are reliable (Kang, 1993; Li & Kang, 1993): the semantic radicals only indicate the semantic category of the compound characters, while the validity of the phonetic radicals is low, as only 38% of ideo-phonetic compounds have phonetic radicals of identical sound.

As for these characteristics, studies on both CSL and native Chinese-speaking learners' have identified specific component skills related to literacy development in Chinese.

Foundational skills for Chinese literacy development

Orthographic skill. Chinese orthographic skill, referring to the knowledge and awareness of the orthographic conventions and rules for Chinese characters (Wei et al., 2014; Yeung et al., 2013b), has been found to play an important role in CSL and native-Chinese-speaking learners' literacy development. Numerous studies have shown that componential radicals are important processing units in Chinese character recognition for both native Chinese-speaking readers (Pine, Huang, & Huang, 2003) and CSL learners (Shen, 2005; Shen & Ke, 2007). Chinese orthographic knowledge and skills are related to Chinese character recognition (Cheung et al., 2006; Yeung et al., 2011; Yeung et al., 2013b) and reading performance (Ho, Ng, & Ng, 2003; Zhang et al., 2012). As for CSL learners, Williams (2013) and Tong and Yip (2015) found that sub-character radical processing was evident during their Chinese character reading, whereas Leong, Tse, Loh, and Ki (2011) and Shum et al. (2014) found that orthographic processing facilitates text comprehension. Specifically, from a longitudinal study on primary NCS students' character reading and reading development, the PI identified that students' orthographic knowledge is

crucial for their Chinese character learning (Wong, 2016a), which in turn influences the development of their reading comprehension (Wong, 2017a, 2017b). In sum, the findings of this sizable body of research suggest unequivocally that orthographic skill is influential in Chinese learners' literacy development.

Transcription skill. Closely related to orthographic skill, spelling transcription skill and handwriting fluency have also been found to play an important role in Chinese learners' literacy development. Researchers have found that, for the complex structural properties of the writing system, the acquisition of Chinese literacy is enhanced by handwriting practices that strengthen visual-orthographic representations of characters in both native-speaking children (Chan, Ho, Tsang, Lee, & Chung, 2006; Tan, Spinks, Eden, Perfetti, & Siok, 2005) and Chinese L2 learners (Guan, Perfetti, & Meng, 2015). Both Tan et al. (2005) and Chan, Ho, Tsang, Lee, and Chung (2006) found a substantial relationship between Chinese character reading and writing in normal children and children with dyslexia respectively. Furthermore, consistent with the study findings in alphabetic languages that transcription skills facilitate writing performance, Yeung, Ho, Chan, and Chung (2013a) also observed that Chinese children's handwriting skills and spelling were significant predictors, among other factors, of their text writing in early elementary grades. Transcription skill is beneficial for the learning of reading and writing in Chinese.

Phonological and morphological skill. Relating to the characteristics of Chinese language, McBride and Wang (2015) deliberated the nature of phonological and morphological skills identified by research as cognitive cores for Chinese literacy acquisition: for the former, it is the learners' awareness of syllables and lexical tones in spoken Chinese; and, for the latter, it is their awareness of and ability to manipulate morphemes, the smallest units of meaning, which,

in Chinese, refer largely to the Chinese characters and semantic radicals of the dominant ideo-phonetic compounds. Specifically, studies found that learners' syllable awareness and tone detection are associated with character recognition (Li, Shu, McBride-Chang, Liu, & Peng, 2012; McBride-Chang et al., 2008) and that their ability to manipulate compound morphology and detect homophones/homographs with different meanings predict vocabulary knowledge (McBride-Chang et al., 2008) and character recognition (Li et al., 2012; Liu & McBride-Chang, 2014).

Linguistic comprehension. Along with lower level decoding skill (e.g. character recognition in Chinese), linguistic comprehension, referring to a wide spectrum of oral language skills, is the other major componential process identified by Gough and Tumer (1986) for reading comprehension in their simple view of the reading model. This model has been extensively examined and supported by research across different types of orthography (Florit & Cain, 2011), including those of Chinese (e.g. Ho et al., 2012; Wong, 2017). In the PI's studies on local NCS students' Chinese reading comprehension development (Wong, 2017a, 2017b), it was found that students' listening comprehension and Chinese character reading could together account for a significant portion of variance in their reading comprehension across grade levels, both concurrently and predictively. The results suggested that linguistic comprehension, as an indicator of oral language skill, is important for students' Chinese literacy development.

Theoretical and/or conceptual framework of the project

The proposed intervention: Foundational Chinese Literacy Skills Instruction

In view of the above research findings, the proposed study argues that we may adopt an instructional approach to facilitate NCS students' Chinese literacy development by cultivating the above-stated foundational component skills. This Foundational Chinese Literacy Skills Instruction, referred to as Foundational Instruction henceforth, adopts a systematic, analytic pedagogical approach supporting students' Chinese literacy acquisition and development. As shown by the PI's survey study on the literacy instructional practices of NCS students' Chinese language teachers (Wong, 2016b), experienced teachers showed a propensity for using pedagogical approaches with features similar to Foundational Instruction, but in a rather sporadic manner. To enhance learning effectiveness, Foundational Instruction will explicitly teach the structural properties of the Chinese language and use them as guiding principles for the development of learning materials and activities. Moreover, the development of Foundational Instruction is based on effective strategies and designs identified from the findings of research on Chinese language instruction and the literature of Chinese language educators' classroom practices, for both native Chinese-speaking and CSL learners. Specifically, Foundational Instruction has the following features.

Orthographic-based. This refers to the stress on teaching Chinese orthographic knowledge and the use of this knowledge to facilitate students' Chinese character learning. This approach has been in vogue among CSL educators in recent years (Shen, 2013) and has also been adopted, albeit sporadically, by Chinese teachers of NCS students in Hong Kong (Tse, Ki, & Shum (Eds.), 2012). As with Foundational Instruction, students will be introduced to a well-defined knowledge base of basic Chinese literacy, in which simple character learning constitutes a critical part. To this end, a list of high-learning-priority characters, a majority of which will be

simple characters, will be developed and introduced to the students. Moreover, the students at this stage will also be provided with instruction on basic concepts and knowledge pertaining to Chinese literacy. Character copying, a learning strategy supported by research to be effective for character learning (e.g. Chan et al., 2006), will also be used in tandem with design to heighten their awareness of the structural properties of the character (McBride & Wang, 2015).

Once these high-priority characters and basic concepts have been taught, students will then be instructed on the concept of the radical so as to facilitate their learning of the majority, compound characters. This is similar to the ‘radical approach to character learning’, for radicals constitute its core, which is widely used in literacy instruction for both Chinese-speakers and CSL learners. This approach is in agreement with some effective Chinese character instruction provided for native Chinese-speaking children such as ‘Focused and Intensive Character Acquisition’ (in Chinese, 集中識字), ‘Componential Approach for Character Acquisition’ (in Chinese, 部件識字), and ‘Principles of Character Formation for Acquisition’ (in Chinese, 字理識字) (Zhang et al., 2000). This approach has been supported by research to be an effective way of presenting learning content and organizing learning activities for CSL learners (Shen, 2004; Xu et al., 2014).

Emphasis on enhancement of metalinguistic awareness. Other than the orthographic awareness mentioned above, Foundational Instruction also aims to promote students’ morphological and phonological awareness. Regarding morphological awareness, Foundational Instruction emphasizes the morphological analysis of words (i.e. the ways in which characters combine to form words), the shape-to-meaning connections in simple characters, and knowledge

of semantic radicals as constituents of compound characters. These methods have been found by research to be effective for Chinese children's character learning (e.g. McBride & Wang, 2015). In my study of NCS students' character reading (Wong, 2016a), the PI also found that analyzing the morphological structure of words is beneficial to both the students' word and character learning. Regarding phonological awareness, although acquiring literacy itself is likely to help CSL learners recognize syllables in Chinese naturally (as most characters represent syllables); however, particularly for those lagging behind, Foundational Instruction aims facilitating their learning by making the point explicit and in tandem with morphological analysis of words as stated above.

Apart from the above-stated features, Foundational Instruction does not underestimate the importance of oral language competence in CSL learning and teaching. The findings of studies on NCS students' reading comprehension development (Wong, 2017a, 2017b), for example, clearly indicated that students' oral linguistic comprehension accounted for a significant amount of their reading variance against Chinese decoding competences. As such, Foundational Instruction, although with a focus on literacy, is also keen on developing the students' literacy skills based on essential oral language skills, such as vocabulary and listening comprehension, which are both highly related to literacy development.

In sum, Foundational Instruction is orthographically-based and metalinguistically-focused, which are based upon oral language. Based on critical Chinese literacy skills and effective instructional approaches identified by research, it aims to develop NCS students' Chinese literacy skills in a comprehensive and systematic way.

Research Questions

Based on the findings of a sizable body of research on native Chinese-speaking and CSL learners' literacy acquisition and instruction, including those of the PI's longitudinal study on Hong Kong NCS students' literacy development and a survey study on their Chinese teachers' instructional practices, the proposed study aims at enhancing the effectiveness of CSL literacy instruction by implementing an intervention study in the Hong Kong primary school CSL classrooms of NCS students. Specifically, the research question was: How effective is the intervention, Foundational Chinese Literacy Skills Instruction, in promoting primary NCS students' Chinese literacy acquisition? The findings of the study would provide us with a better understanding of the course of NCS students' Chinese literacy developmental trajectory and the nature of effective CSL literacy instruction tailored to their needs.

Methodology

The study lasted for two years during which time the Chinese literacy development of approximately 200 NCS students from five schools were investigated. Their Chinese native speaking (CNL) counterparts would be evaluated for comparison purpose. The intervention, i.e. Foundational Instruction, was implemented in these students' Chinese lessons for a school year. Designating the students into treatment and control groups, the study adopted a between-participants-comparison design: one group of students will first receive the intervention (treatment group) and their progress rate be measured and compared to that of the other group, who serves as wait-list control and will receive the intervention later. As such, the students' Chinese language and literacy competences, including the component skills, were assessed at

two points during the project implementation. Details on the implementation of the project were as follows.

Participating schools and students

Five schools were invited to join the study. All five schools have a substantial proportion of NCS students of low to moderate socioeconomic status. As in the case of Chinese language education provided for the local Chinese-speaking students, all schools allocate substantial lesson time to the subject and adopt Cantonese as the spoken language of the class; however, in response to students' limited Chinese proficiency, the schools have developed a school-based Chinese curriculum and adapted simpler learning materials. The Chinese language teachers in these schools are, on average, experienced with providing CSL instruction to NCS students. All Chinese language panel chairpersons of the four schools are themselves experienced, effective classroom teachers, and were highly facilitative in the implementation of my previous study in the schools.

The targeted students of the study were those at senior-primary grade levels. This choice was made with reference to the PI's previous longitudinal research, in which senior primary students' literacy development from Grades 4 to 6 was studied. NCS students in the middle grades are generally equipped with a certain degree of spoken Chinese competence and the acquisition of Chinese literacy is normally the major difficulty in their Chinese lessons. As such, Foundational Instruction may address their learning needs and this conformity between teaching and learning is facilitative for the project implementation.

Implementation of Foundational Instruction

The details of Foundational Instruction have been stipulated above. As a pedagogical approach, it was incorporated into the Chinese literacy lessons of the five schools. Respective Chinese curriculums of each school were reviewed and elements of Foundational Instruction were blended in and learning effectiveness maximized. A sizable body of instructional and learning materials, e.g. lesson plans, worksheets, PowerPoint slides (for classroom presentation), etc. were provided for the teachers. The instructional package was refined to tailored to the learning needs of the students as shown from data collected by the first wave. Details would be provided later in the Results section. As stated previously, the intervention was implemented in the schools for a school year. Pre- and post-intervention review meetings were held with the school teachers for preparation and evaluation respectively.

Evaluation of the effectiveness of Foundational Instruction

A range of Chinese language assessments were administered to evaluate the students' metalinguistic awareness, listening comprehension, Chinese character reading, handwriting fluency, and spelling, as follows:

Orthographic awareness. The orthographic awareness test was developed with reference to those adopted by Ho, Ng, and Ng (2003) and Shen and Ke (2007), and used in Wong (2017, 2019). The orthographic awareness test consists of two parts: assessing the students' visual-orthographic sensitivity to Chinese characters and their awareness of the semantic radicals' representational functions. Part 1 comprises a radical perception test that requires the students to divide a compound character into two immediate componential radicals; for example, to divide character 拏 (clutch, /ak1/) into the semantic radical 扌 (indicating hand-related motions) and the phonetic radical 厶

(adversity, /ak1/). Part 2 assesses participants' skill in using the information provided by the semantic radical to decode a novel character. The participants were shown a picture (provided with an English illustration) and were required to choose the novel character with the meaning that best matched the picture from three options. For example, from the three options of 持 (hold, /ci4/), 峙 (stand up, /ci5/), and 侍 (waiter, /si6/), which all share the same phonetic radical 寺 (temple, /zi6/), they should have chosen 侍 to match the picture of a waiter (as its semantic radical 亻 indicates people). All of the characters were novel to the participants since they are at the Grade 6 level, according to Pan and Kang's (2003) study, and their Chinese teachers confirmed that none of the words had been covered in their Chinese lessons. There were 12 and 20 items in parts 1 and 2, respectively, for a total of 32 items. The test had a good reliability, with a Cronbach's alpha of .82.

Phonological awareness. The phonological awareness test was developed with reference to the measures adopted in Li et al. (2012) and Tong and McBride-Chang (2010). The test has two sections assessing the participants' phonological sensitivity at the syllabic and sub-syllabic (i.e., onset/rime/tone) levels. In Part 1, the participants were required to reproduce a Chinese word/phrase minus one of the syllables, e.g., removing the syllable /luk6/ (綠, green) from the word /hung4 luk6 dang1/ (紅綠燈, traffic light) and reproducing /hung4 dang1/. The Part 2 items had an "odd-man-out" format, with students required to identify a syllable with a systematic difference from the rest, among four options. For example, in the four options of /fung1/ (風, wind), /faa1/ (風, flower), /fui1/ (風, ash), and /gan1/ (風, a unit of weight), the correct answer is /gan1/ as it has a different onset /g/ from the rest of /f/ (while all four options have the same tone

of 1 and different rime). There were 18 items in each of Parts 1 and 2, for a total of 36 items. The test had a good reliability, with a Cronbach's alpha of .90.

Morphological awareness. The morphological awareness test was developed with reference to Li et al. (2012), McBride-Chang et al. (2008), and Zhou et al. (2018). The test has two sections. Part 1 has 12 homophone judgment items in the “odd-man-out” format. The students were required to identify a homophone with a different meaning, from among three options; for example, to identify that /bui3/ of /bui3 hok3/ (貝殼, sea shell) is different from that of /bui3 zek3/ (背脊, backbone) and /bui3 min6/ (背面, back side). Part 2 is a morphological construction task with seven items. In each item, the students were presented with a simple morphological analysis of a word compound, that is, the compound's constituent morpheme, and were then required to construct a new compound with the acquired morphological structure. For example, the word compound /cing1 zuk1 se4/ (青竹蛇, a kind of snake) was elaborated as “a snake (蛇, /se4/) that is green (青, /cing1/) and looks like a bamboo (竹, /zuk1/),” and the students were required to construct a new compound for “a snake that is red (紅, /hung4/) and looks like a belt (帶, /daai3/)” (the correct answer is /hung4 daai3 se4/ 紅帶蛇). There were a total of 19 items with a satisfactory reliability of Cronbach's alpha .75.

Listening comprehension. The listening comprehension test was taken from a local standardized test, namely the Hong Kong Attainment Test (HKAT) (Educational Research Section of the Hong Kong Education Department, 1989a, 1989b, 1999a, 1999b), and a school-based Chinese language listening test developed by the Curriculum Development Institute of the Hong Kong Education Bureau (2011) for junior-primary

ethnic minority students. As the HKAT was developed to assess local Chinese-speaking children's abilities in Chinese, the items adopted by this study were of a lower grade level (i.e., grade-1) to compensate for the lower Chinese competence of the participating ethnic minority students. The test consists of two parts. Part 1 comprises an oral vocabulary test, in which the students were required to match a picture with a targeted word that was given in a simple context, e.g., "Tom is a teacher. What does Tom do for a living?" Part 2 comprised multiple-choice questions on some listening material content to assess the students' comprehension ability. The test had a good reliability of Cronbach's alpha .87.

Chinese character reading. The Chinese character reading test was used in Wong (2017, 2019). It consists of test items as single characters or two-character words. Chinese characters at the grade 1 level were selected with reference to Pan and Kang's (2003) study on the use of Chinese characters in Hong Kong primary schools. All items were also verified against a list of basic Chinese words; the list was prepared for Hong Kong primary students (Chinese Language Education Section of the Hong Kong Education Bureau, 2008) to ensure that the words are at the junior-primary level. Among the 100 character items that were chosen in total, 50 were single characters and 25 were two-character words. The test was designed as an individual test, and the students were required to read out the characters one by one and follow the test administrator's instructions. Each correct pronunciation was awarded one mark. The test had a good reliability, with a Cronbach's alpha of .98.

Chinese spelling. A dictation test was used to assess the students' Chinese spelling. The students were required to write down single characters, two-character words, and four-character phrases. As a facilitation, both single-character and two-character word items were presented

with corresponding pictures, and each of the four-character phrases was presented in a sentence to provide context. All target items and sentences were read aloud to the students. The target items were also verified against the list of basic Chinese words that was prepared for Hong Kong primary students (Chinese Language Education Section of the Hong Kong Education Bureau, 2008) to ensure that the words are at the junior-primary level. The test had a good reliability, with a Cronbach's alpha of .95.

Data collection and analysis

The study was conducted in two phases which were designated as Study 1 and 2 respectively. In Study 1, the first-wave data was analyzed to see: (1) What are the differences between NCS students and their CNL counterparts in terms of Chinese metalinguistic awareness, listening, and literacy proficiency? (2) What are the contribution of various metalinguistic awareness types to CSL students' Chinese reading and spelling, respectively? The findings were used to evaluate the students' Chinese competences and to inform the refinement of the Foundational Instruction to better support their literacy acquisition. In Study 2, the post-intervention test performances of the treatment and control groups were compared, controlling for their initial Chinese competences, to evaluate the effectiveness of the Foundational Instruction.

Results and Discussion

In this section, the results two phases of the study, i.e., Study 1 and 2, would be reported and discussed respectively.

*Study 1*¹

As stated above, the two questions for Study 1 were: (1) What are the differences between NCS learners and their CNL counterparts in terms of Chinese metalinguistic awareness, listening, and literacy proficiency? (2) What are the contribution of various metalinguistic awareness types to NCS students' Chinese reading and spelling, respectively? In total, 268 primary students from five schools participated: 222 NCS students (119 boys, 103 girls) and 46 CNL students (22 boys, 24 girls). A range of Chinese language proficiency assessments, as stated above, were administered, evaluating Chinese character reading, dictation, orthographic awareness, phonological awareness, morphological awareness, and listening comprehension. A *t*-test was used to compare the performance of NCS and CNL students. Then, the influence of various metalinguistic awareness types on character reading and spelling in NCS students was evaluated using regression analysis.

Descriptive statistics for all measures in NCS and CNL students and *t*-test results comparing their performance are provided in Table 1. As expected, CSL students performed significantly worse than CNL students on all measures, particularly character reading, dictation, and listening comprehension.

Table 1. Descriptive statistics and *t*-test results for CSL/CNL students (*N*=268).

Measure	Group				95% CI for Mean	
	CSL (<i>n</i> =222)		CNL (<i>n</i> =46)		Difference	<i>t</i> (<i>df</i> =266)
	M	SD	M	SD		
Character reading	29.08	23.01	87.91	13.71	-63.88, -55.79	-23.14 ^{**a}
Dictation	11.20	9.76	33.65	7.58	-25.03, -19.87	-17.33 ^{**a}
Listening comprehension	6.08	2.73	11.24	2.60	-6.01, -4.31	-12.14 ^{**a}
Phonological awareness	20.96	7.45	23.17	4.77	-3.92, -4.31	-2.56 ^{*a}
Morphological awareness	13.82	7.59	25.72	7.01	-14.29, -9.50	-9.79 ^{**}
Orthographic awareness	19.71	5.66	27.54	3.88	-9.20, -6.47	-11.41 ^{**a}

Note: ^a *t*-test of mean difference without group equal variances. ^{**} *p* < .01, ^{*} *p* < .05

NCSL students' performance was further analyzed by evaluating the influence of metalinguistic awareness types on their character reading and dictation using regression analysis, controlling for oral language competence (indicated by listening comprehension). The results reveal that the models accounted for significant variance—62% and 61%—in character reading and dictation, respectively (see Table 2). As indicated by the respective β -values and squared semi-partial correlations (*sr*2s), most metalinguistic awareness types—aside from phonological

awareness for character reading—accounted for a significant, unique portion of variance in character reading and dictation, respectively.

Table 2. Regression analysis explaining character reading/dictation from metalinguistic awareness types and listening comprehension in CSL students (N=222).

Variable	R ²	β	sr ² (%)	t
Dependent				
Character reading	.62**			
Independent				
Listening comprehension		.37	8.41	6.96**
Phonological awareness		.08	0.64	1.78
Morphological awareness		.19	2.56	3.75**
Orthographic awareness		.36	7.84	6.53**
Dependent				
Dictation	.61**			
Independent				
Listening comprehension		.28	4.84	5.27**
Phonological awareness		.13	1.21	2.66**
Morphological awareness		.11	0.81	2.18*
Orthographic awareness		.46	13.69	8.68**

** $p < .01$, * $p < .05$

The *t*-test results reveal that the Chinese proficiency of NCS students was much poorer than their CNL counterparts. As in Wong (2017), their low Chinese proficiency greatly complicates their education in Hong Kong. They exhibited particular deficits in basic character

reading and spelling, which must be detrimental to their long-term reading and writing development. These results clearly indicate the necessity of improved literacy instruction for these students. More importantly, the regression results, which corroborate the findings of research concerning young Hong Kong's CSL learners' literacy development (Wong 2017, 2018; Zhou and McBride 2015), identified the metalinguistic awareness types that affect students' character reading and spelling: orthographic, phonological, and morphological awareness. Using these findings, the Foundational Instruction was developed to facilitate students' Chinese literacy by cultivating these various aspects of metalinguistic awareness. As stated above, it stressed improving (1) Chinese orthographic conventions, such as Chinese characters sub-components and compositional regularity; (2) students' phonological and morphological awareness, by emphasizing orthographic differences among Chinese homophones, morphological word analysis (how characters combine to form words), and shape-to-meaning connections in characters; and (3) students' oral language skills, foundational to literacy. Sets of learning materials provided for the schools were attached as Appendix.

Study 2²

The aim of Study 2 was to evaluate the effectiveness of the Foundational Instruction. The participants were the NCS students. As stated before, the Foundational Instruction was implemented in the treatment-group students' Chinese lessons, with instructional packages and learning materials provided for the teachers. There were a total of 199 grade-four NCS students from five schools, with 97 students in the treatment group and 102 students in the control group. Both groups were assessed with the set of Chinese competence measures (some with renewed

content for better measurement) by the end of the school year. The second wave of data was then compared with those of the first wave to see the students' progress as an indicator of the programme's effectiveness.

Descriptive statistics for all the students and the treatment and control groups of students across the two waves of data collection (i.e., year 1 and 2) were presented at Table 3.

Table 3. Descriptive statistics for the treatment and control groups of students

Measure	Group			
	Treatment (n=97)		Control (n=102)	
	M	SD	M	SD
Character reading Y1	35.36	20.89	24.82	23.35
Character reading Y2	44.15	22.75	29.75	25.65
Dictation Y1	12.98	8.18	10.08	10.43
Dictation Y2	11.21	6.99	7.22	7.59
Phonological awareness Y1	22.22	6.55	20.05	7.79
Phonological awareness Y2	23.35	5.64	22.95	5.98
Morphological awareness Y1	15.10	7.85	12.40	7.62
Morphological awareness Y2	17.60	6.26	14.40	8.00
Orthographic awareness Y1	21.56	5.13	18.34	5.58
Orthographic awareness Y2	24.01	4.51	20.13	6.06

Note. Y1: Year 1, Y2: Year 2

It was noted that (1) there was a general tendency of improvement in performances across groups and measures, and (2) the students of treatment groups performed generally better than those of control groups. As to evaluate the general progress of all the students across the year, paired *t*-tests were conducted and the results were presented in Table 4. It was shown that all the students, regardless of in the treatment or control group, performed better on all measures except spelling after a year, with statistically significant paired *t*-test values ranging from $t(198) = -4.01, p < .01$

(phonological awareness) to $t(198) = -10.05, p < .01$ (character reading). The regression on the dictation measure might be due to the use of different test items on measures of wave 1 and 2, and the items on the wave-2 measure were more difficult than those on the wave 1.

Table 4. Paired *t*-test results of all measures across the year (*N*=199)

	95% CI for Mean Difference	<i>t</i> (<i>df</i> =198)	<i>p</i>
Character reading Y1 – Y2	-8.15, -5.48	-10.05	.00
Dictation Y1 – Y2	1.66, 3.00	6.80	.00
Phonological awareness Y1 – Y2	-3.04, -1.04	-4.01	.00
Morphological awareness Y1 – Y2	-3.23, -1.25	-4.46	.00
Orthographic awareness Y1 – Y2	-2.68, -1.56	-7.35	.00

As the students of the treatment and control groups were of different levels of Chinese competences by the start of the project (refer to Table 1), a series of analysis of covariance (ANCOVA) was conducted to evaluate the rate of improvement of the treatment group as against the control group controlling for the effect of their previous Chinese competences, i.e., using the student performances of respective measures at wave 1 as correlates. The treatment effects, if any, would be indicated by the partial eta-squared (η_p^2) values. The results were presented in Table 5.

Table 5. ANCOVA results of all measures for the treatment effects across the year

	$F(1, 196)$	p	η_p^2
Character reading	7.53	.01	.04
Dictation	14.86	.00	.07
Phonological awareness	.18	.67	.00
Morphological awareness	4.35	.04	.02
Orthographic awareness	8.16	.01	.04

The ANCOVA results showed that, controlling for pre-test attainments, students of treatment group gained greater improvement than those of control group in all competences except phonological awareness, including that on dictation which all students regressed as compared to previous year. The treatment effects ranged from the greatest on dictation ($\eta_p^2 = .070$) to the smallest on morphological awareness ($\eta_p^2 = .02$). The insignificant effect found in phonological awareness might be due to the fact that: (1) syllabic awareness is rather easy to develop and would thus have a ceiling effect, and (2) sub-syllabic like tone awareness may not be easy in Hong Kong's Chinese classroom as no phonological encoding system (like the *Hanyu Pinyin* for Putonghua) is provided. Overall, the findings supported the effectiveness of the Foundation Instruction in developing the NCS students' Chinese literacy skills (character reading and spelling) by promoting their orthographic and morphological knowledge and awareness. To enhance learning effectiveness, teachers may explicitly teach the structural properties of the Chinese language and use them as guiding principles for learning content development.

Conclusions and Recommendations

The results supported (1) the importance of the metalinguistic awareness to the NCS students' Chinese literacy skills (i.e., character reading and dictation), and (2) the effectiveness of the Foundational Instruction in developing the students' Chinese literacy. The instructional/learning materials (e.g. lesson plans, worksheets) of the instructional approach is of reference value, particularly for the Hong Kong NCS students' Chinese learning and teaching. It is recommended that (1) samples of the instructional and learning materials to be made available to teachers of NCS students for references and (2) the findings of the project to be disseminated in CSL teacher training workshops or seminars to facilitate development of effective school-based curriculum and instructional approach. The Principal Investigator of the project held a professional development seminar entitled "Supporting NCS students' Chinese learning: Facilitating their literacy development 支援非華語學生學習中文：促進讀寫能力發展", which was open for all Hong Kong's Chinese teachers of primary and secondary schools, on 22 February 2019 at the Chinese University of Hong Kong. The PI has also shared the findings in the undergraduate, postgraduate diploma, and master's degree courses taught by him in the university.

The present findings suggested that Chinese teachers of the NCS students (and CSL learners in general) may adopt a systematic, analytic approach to Chinese literacy instruction. The instruction should aim at helping the students acquire character knowledge by building up orthographic and morphological knowledge with instructional practices such as analyzing word-compound and characters' orthographic structure, explicit teaching of radical knowledge, and

combination regularities. Teachers may also make use of character copying at a reasonable level to consolidate students' character knowledge and facilitate their spelling. Acquiring literacy is likely to help CSL learners recognize syllables in Chinese naturally (most characters represent syllables); however, for those lagging behind, teachers may facilitate their learning by making the point explicit. Finally, it should be noted that Chinese oral language is highly related to the various metalinguistic awareness types and has a substantial influence on all literacy abilities; thus, oral language should be a core component of the CSL curriculum. Furthermore, efforts should be made to identify relevance to literacy learning; for example, pointing out the one-to-one character–syllable and character–morpheme relationships, in addition to using different characters to differentiate homophones and homographs.

As for Chinese curriculum and instructional materials development for the NCS students, the findings also support a systematic-progressive approach, in which beginning learners are introduced to a well-defined basic Chinese literacy knowledge core, in which simple character learning is critical. To this end, a list of high-learning-priority characters, which will be mostly simple characters, should be developed and introduced early in the students' Chinese literacy learning. These high-priority simple characters are: (1) productive as constituent radicals, generating a large number of compound characters (e.g. 心 generates 想 (/soeng2/, 'to think') and 忘 (/mong4/, 'to forget'); 口 generates 吐 (/tou3/, 'to spit') and 唱 (/ceong3/, 'to sing')); and (2) productive as character-morphemes in generating a large volume of words (e.g. 心 generates 心願 (/sam1jyun6/, 'wish'); 口 generates 口音 (/hau2jam1/, 'accent'). As such, these

simple characters will be highly facilitative for the students' acquisition of compound characters and words. Students at this stage may also get instruction on basic concepts and knowledge pertaining to Chinese literacy. The research team also found that character copying, conducted under proper guidance and at reasonable level (i.e., not too many), is facilitative to the students' character reading and dictation as well.

After teaching high-priority characters and basic concepts, instructors can explicitly introduce the concept of the radical to facilitate learning of compound characters. This kind of instruction has been called the 'radical approach to character learning', for radicals constitute its core, and it is widely used in literacy instruction for both Chinese-speakers (as shown in e.g. Zhang et al., 2000) and CSL learners (e.g. Hu, 2008). Current approaches to CSL literacy instruction for ethnic-minority students in Hong Kong show that this radical-based approach is effective and useful (e.g. Li, 2015; Tse et al., 2012). In some variants, learners are first taught two-radical ideo-phonetic compounds like 想, 忘, 吐, 唱 to develop their sense of the radicals, including their spatial-positional relationships when used as constituent radicals (left-right, top-down, and surrounding). High-frequency semantic radicals and compound characters that share the same semantic radical are introduced as a group. On the other hand, the phonetic radical can also be used as a grouping criterion. For example, the five characters 疤 (/baa1/, 'scar'), 把 (/baa2/, 'to handle'), 爸 (/baa1/, 'father'), 吧 (/baa6/, a sentence-final particle), and 肥 (/fei4/, 'fat') all share the same phonetic radical 巴 (/baa1/, 'to hope'), with different degrees of similarity in sound, and thus are taught as a group. While the shared radical component 巴, which is called the 'basic character' in character learning, facilitates memorisation of the five characters, the different semantic radicals (疒, 扌, 父, 口, and 月) help

to distinguish among the characters by indicating their different meanings. In short, the radical approach makes learners' radical awareness explicit and uses radicals as a catalyst for character learning.

Note.

¹ Preliminary results of Study 1 was presented in Wong (2020a).

² Preliminary results of Study 2 was presented in Wong (2020b).

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