

***Pinyin* input experiments in early Chinese literacy instruction in China: Implications for Chinese curricular and pedagogic reform in Singapore**

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Abstract

In this paper we intend to provide a review of *pinyin* input experiment studies in Chinese literacy instruction in China and to inform the current reform of Chinese education in Singapore. We first provide a brief account of some major *pinyin*-based methods for inputting characters into the computer. This is important because the skill of inputting characters into the computer constitutes beginning electronic literacy and it is essential for the *pinyin* input experiments in Chinese literacy instruction. Secondly we review some studies on the use of *pinyin* input methods in Chinese literacy instruction. In conclusion, we discuss the major points of the *pinyin* input experiment in relation to the Singapore context and highlight implications for the current reform of Chinese literacy education envisioned by the Chinese Curriculum and Pedagogy Review Committee in Singapore.

Introduction

In the present Singapore bilingual language policy and school curricula, English is taught and learned as a first language and Chinese language (as Malay and Tamil), a Mother Tongue, is maintained as a second language. The major assumption in a maintenance bilingual program is that Mother Tongues are valuable assets which are viewed as encompassing not only communication but heritages, cultural values, identities and feelings (Cheah, 2003; Goh, 2004). Because of their unique position in the society and school curricula, Chinese language education is one of the heatedly debated areas in the public media and parliament. Although the language planning and management in Singapore are described as successful and effective (e.g., Cheah, 2003; Goh, 2004), the outcomes of them have posed tough curriculum problems and pedagogical issues for Chinese language classroom teachers and teacher educators.

There is increasing evidence that Chinese language teachers are facing greater challenges in engaging and motivating students to learn the Chinese language and the students' Chinese language proficiency level has been declining (e.g., Chew, 1998; Leong, 2001; Ong, 2002). At the same time, some community members begin to voice their concerns about their children's learning capacity to deal with two different languages and other subjects in schools and demand that the level of Chinese language proficiency should be set at a more reasonable and achievable level (e.g., The Chinese Language Curriculum and Pedagogy Review Committee, 2004). However, others including Chinese teachers/educators, express their heart-felt worry of a "Chinese language and cultural crisis", as students have not achieved the level of basic language proficiency (Chew, 1998; Leong, 2001; Ong, 2003).

To accommodate the different concerns, recently the Chinese Language Curriculum and Pedagogy Review Committee (2004) made and MOE accepted quite a few recommendations for the reform of the Chinese curriculum and pedagogy in next few years. One of the most important recommendations is that less emphasis be placed on training students how to write Chinese characters. Instead, it will focus more on developing

students listening, speaking and reading skills rather than writing and learning Chinese characters. The recommendation is claimed to be based on the understanding that the Chinese written register is not the essential mode of communication in the Singapore society. In addition, the current emphasis on Chinese characters and writing rather than on oral communicative skills relevant to the local context is believed to have quenched students' learning motivation and interest. Thus the motivation for this initiative is supposed to change the current "unproductive" classroom practice and to create pedagogical practices where Chinese learning would be fun and interesting. Clearly the new policy/initiative has placed high demanding on both the curriculum developers and Chinese language practitioners. The question is "how to teach students reading with less emphasis on writing?". To address this question we conducted a search of extant literature. The search reveals that the *pinyin* input pedagogy in Chinese literacy education in China can shed light on the implementation of the new initiative.

Therefore, in this paper we intend to provide a review of *pinyin* input experiment studies in Chinese literacy instruction in China and to inform the current reform of Chinese education in Singapore. First of all, we provide a brief account of some major *pinyin*-based methods for inputting characters into the computer. This is important because the skill of inputting characters into the computer constitutes beginning electronic literacy and it is essential for the *pinyin* input experiments in Chinese literacy instruction. Secondly we review some studies on the use of *pinyin* input methods in Chinese literacy instruction. In conclusion, we discuss the major points of the *pinyin* input experiment in relation to the Singapore context and highlight implications for the current reform of Chinese literacy education envisioned by the Chinese Curriculum and Pedagogy Review Committee in Singapore.

***Pinyin* Input Methods**

Pinyin input methods of Chinese character encoding are based on *Hanyu Pinyin Fang'an* (Scheme of the Chinese Phonetic Scripts). This scheme, which consists of 22 initials (similar to the English consonants) and 36 finals (similar to the English vowels) by using the 26 standard letters with only one extra /ü/, has proved to be the easy system of phonetic symbols to learn. Within a few weeks, people can learn how to use it to help pronounce characters. Therefore, it has been widely used in education as an annotated means to facilitate early Chinese literacy development (for recent development, see Liu, in press). Due to its use in Chinese literacy education for years since 1958, almost all the literate mainland Chinese know how to use it. That is why the *pinyin* input method is most celebrated in the application of ICT in China. Knowing the *pinyin* or the pronunciation of a character, one only needs to type the letters of *pinyin* and the input program will convert them into characters. This popular encoding method has recently developed into three major types: *Shuangpin* (Double *pinyin*), *Quanpin* (Full *pinyin*) and *Zhengju* input (whole sentence input).

Although *Shuangpin* and *Quanpin* are both developed from a *pinyin*-based encoding method, they are different in terms of the number of letters to be keyed in. As *Shuangpin* assigns the 22 initials and 36 finals to the different 26 letter-keys on the standard computer keyboard, it is not necessary to input all the letters, as is in the case of *Quanpin*, by keying in all the letters of the *pinyin* with regard to the character in question to get it on the screen. Instead, only by typing the first letter standing for the initial and the first letter for the final, the character concerned can be input into the computer. In other words, to input a character into the computer by using *Shuangpin*, usually only two letters need to be typed and therefore the efficiency of input increases (Zhang, 1992). On the contrary, *Quanpin*, as its name implies, requires that the user should type all the letters of *pinyin* in order to enable the program to convert them into a particular character on the screen. Obviously, it is slower

to use *Quanpin* in terms of input efficiency than to use *Shuangpin*. However, *Quanpin* is much easier to use than *Shuangpin* because *Shuangpin* involves certain rules for the user to memorize. To meet the different user preferences, the two methods are now usually combined in the software readily available and used in the internet, and thereby users can make easy shift between the two.

As the *pinyin* input method in general is based on the pronunciation of characters and the *Hanyu Pinyin Fang'an*, it is more compatible to the English input method, thus making it easier for Chinese and English bilinguals to shuttle between Chinese and English both in terms of word processing and the internet navigation. More importantly, the *pinyin* method is assumed to be helpful for users to standardize their pronunciation. Therefore, the wide use of it will further promote the popularization of the standard Chinese or Mandarin (Wang, 1995), because one has to know how to pronounce the character correctly in order to use the input method efficiently. Another feature of this input method is that there is no need for the user to memorize any extra rules so long as he/she knows how to pronounce the character. This advantage has successfully been taken by Chinese researchers to facilitate Chinese literacy instruction to children, which we will return in next section.

Even though the *pinyin* input method is the most widely used method in Chinese word processing and internet navigation, it has been critiqued that the speed of information input is slow, much slower than in English for example. The Chinese language is basically tonic and very rich in homophones and thousands of Chinese characters are annotated by the *Hanyu Pinyin Fang'an* with a limited set of phonetic symbols (Feng, 1989). When the *pinyin* method is used for input purposes, the user has to choose from a list of the candidates that have the same pronunciation (many are different in tone). The selection takes time and the inputting efficiency is reduced. But, this problem has been partly solved with the recent development of *Zhengju* input (full sentence input) technology. Supported by a large corpus of language data, a new input software is being developed and trialed in China, which enables the user to type full sentences in *pinyin* without much need to go through all homophones listed to get the specific character wanted (Su, 2003). This new input software is revolutionary because it is much efficient in character input and poses almost no difficulty on the user so long as he/she knows the pronunciation of characters. The full sentence input technology is of great significance, especially in Singapore, where speaking and listening skills are more emphasized in the new curriculum. On the one hand, to be able to use the input method efficiently, like the typing of English sentences, one must be able to speak Mandarin in a fluent and standardized way; on the other hand, the frequent use of the *pinyin* input method in writing on the computer will greatly reinforce the knowledge and the use of *pinyin*. It is also true that the use of *pinyin* input methods is quite helpful for the development of the users' standard Mandarin proficiency.

In this section, we have provided a sketch of three basic *pinyin* input methods used in China and in Singapore. Although these methods cannot be compared with English input in terms of efficiency, they do help make the wide spread of Chinese ICT possible. With the popularization of computers in the modern society, children can get more chances to work with computers in their Chinese language learning. Studies on the relationship between *pinyin* input methods and early Chinese literacy instruction has already yielded promising results (Zhou, 1999; Yao, 2003). In what follows, we will review some studies on how the *pinyin* input method has been integrated effectively into Chinese literacy instruction for facilitating the learning of Chinese literacy.

***Pinyin* Input Methods and Early Chinese Literacy instruction: Experiments in China**

Although the technology of writing has been an integral part of the Chinese civilization for millennia, the learning of this technology (in the form of Chinese characters) is considered to be the most challenging problem faced by the Chinese people. The complexity and opaque sound-shape of characters are largely assumed to be

responsible for this difficulty. Since there are no explicit and reliable grapheme-phoneme correspondent rules, many assume that the learning of characters is basically a matter of memorisation, especially for the mastery of the first few hundred simple characters (Liu, In press). There are some phonetic markers in the traditional character-based system, but whether it has the cognitive and pedagogic economy that is often attributed to alphabetic systems (e.g., Goody, 1977) is questionable. Given this context, it is understandable why Chinese literacy researchers have made much more efforts to use computers and input methods, to reform Chinese literacy instruction. The motive driving most research on applications of computers and input methods in Chinese literacy instruction is the desire to improve the learning of character recognition and writing which is typically viewed as a requisite gatekeeper to Chinese literacy and the early Chinese literacy is the most difficult period in the learning process (see Liu, in press). In the next section, we discuss some main principles, processes and results of some input methods studies in early Chinese literacy instruction.

The assumptions and principles of pinyin input experiment

Before discussing main assumptions and features of the *pinyin* input experiment, we consider it necessary to describe how characters are conventionally taught. As noted earlier, *pinyin* is a very effective tool in helping the learning of characters; it has been legitimized as an integral component of the Chinese curriculum in China (see Liu, in press for a review). This conventional way of teaching Chinese characters (which is also standard practice in Singaporean schools) requires the learning of all syllables of *pinyin* before characters are taught with the aid of *pinyin*. Students should, in the first few weeks of their formal school literacy learning, learn the *pinyin* letters and know how to pronounce all *pinyin* syllables with little emphasis on any Chinese characters. The learning of characters normally starts after students master the *pinyin*. Although this method of using *pinyin* to annotate character is effective in helping students learn Chinese characters and promote reading and writing at an earlier time, it is slow in efficiency in terms of recognizing characters. It is “time-consuming”, since “no matter how fluently a student can read stories in *pinyin*, he/she has to finally read articles in Chinese characters” (Zhou, 1999, p.17).

Another conventional practice of teaching characters is that students should be taught to “recognize, understand the meaning of, write, and use” characters simultaneously, so called *Sihui* (to develop four competences). Although this whole language approach is celebrated by many literacy scholars in China (Zhang et al, 2000), it poses greater challenge to children who have just started their early literacy learning, especially to “write” and “use” characters (Zhou, 1999, p.17). As we mention early, the writing of characters is always the most difficult modality for students, because to write them, one has to memorize different and complicated strokes and follow certain order of the strokes concerned. Moreover, to write stories for example in characters, students have to know how to write a large number of characters. This conventional way to train students the four competences in terms of mastering a character very often frustrates and demoralizes beginning Chinese learners. They may want to learn more characters, but when the teacher requires them to write all the characters they have learned, their interests and motivation will degrade (Zhou, 1998, 1999).

In the conventional way of literacy teaching, the curriculum distributes the learning of characters among different grades and the characters required to learn increase as the students grow in age. Normally “primary 1 students are only required to learn a very limited number of characters”, but they are assumed to be “at the best age in terms of their memorizing ability” (Zhou, 1999, p.18). Therefore, it is proposed that more characters should be taught to primary 1 students and help them recognize rather than write a large number of characters in the early period of schooling to facilitate early reading and writing. This proposal was translated

into practice by Shanghai Experimental School in 1991. Drawn upon the above assumption, this school initiated a reform on the Chinese literacy curriculum and pedagogy by adopting the *Shuangpin* input method and integrated the teaching of literacy with the development of students' digital competence. The experiment was later duplicated in many other primary schools around China and the results of these experiments were very promising (Zhou, 1998, 1999, Yao, 2003). The major concept of the experiment is "to use *Dian Nao* (electronic brain, a popular Chinese term for the computer) and to develop *Ren Nao* (human brain)". Therefore, this experiment of the Chinese characters instruction is named "*Shuang Nao*" (Two brains) Character Teaching Method (Zhou, 1999). The *Shuang Nao* method is different from the conventional ways of teaching in several aspects.

In the experiment, children are first taught the letters used for the *Shuangpin* input method. As mentioned earlier, the principle underlying the *Shuangpin* input method is consistent with that for pronouncing a *pinyin* syllable. Therefore, in using the letters to type characters into the computer, children will become more familiar with how to pronounce *pinyin* syllables. In inputting characters into the computer, their pronunciation and their recognition of characters will be enhanced. In other words, *pinyin*, characters and the *pinyin* input method are taught together in the *pinyin* input experiment instead of *pinyin* first and then characters in the conventional way. Thus it is more efficient in early character instruction.

Instead of requiring students to be "*Sihui*", the experiment divides Chinese characters to be learned into two types. The first 1000 characters to be learned are called "*Lianghui*" (two competences) characters, that is, students in their early period of character learning are only required to recognize these characters and know their meanings rather than to write and use all of them. In such a way, students can learn to recognize characters much faster because they are relieved from the burden of memorizing how to write strokes of characters. It is believed that if they can recognize about 1000 characters, students can manage to read anything within their range of knowledge. In other words, they are able to concentrate on extensive reading either in school or at home. Through extensive reading, their understanding of characters will be reinforced, and their interests in learning Chinese are aroused and their knowledge base is expanded. This lays the foundation for the learning of the "*Sihui*" characters in the second stage, where the writing of characters will be more emphasized. Since students in the first stage of character learning, including inputting characters, reading books, etc, have already developed awareness of the shape and structure of character, it will be much easier for them to concentrate more on character writing.

As noted earlier, characters are distributed among different grades in the conventional curriculum, and primary 1 students are only required to learn a very limited number of characters. Different from this conventional practice, the *pinyin* input experiment proposes that students be taught to recognize as many as possible characters in the early stage of literacy learning. Since writing of characters is not required, students can be taught with the input method to develop their character recognizing ability. In this way, they can recognize a large number of characters in the early stage of literacy learning and thereby develop reading literacy earlier, which is not possible in the conventional way. In the conventional character instruction practice, students are taught how to write all characters learned. This is a time-consuming and boring practice for most beginning learners. With the help of computer, by using the *Shuangpin* input method student can type-write all they want to say on the computer without any efforts in hand-writing the characters. This feature of the experiment is unique. It provides a chance for the development of early writing literacy without imposing much difficulty on students in terms of writing the characters. Since students can recognize the first 1000 most

commonly used characters, they can easily write compositions on the computer with the aid of the *Shuangpin* method.

In this experiment, students are taught not only to learn *pinyin* and recognize characters, but also learn how to input characters into the computer. In the information age characterized by the use of computer and information/word processing, it is essential to be able to recognize characters and to input them in the computer. Therefore, it is really innovative to have integrated the development of digital competence with the development of Chinese literacy in the Chinese curriculum and pedagogy.

The *pinyin* input experiment was first trialed in 1991. Drawn upon its continuing experimental experience, Shanghai Experimental School began to revise its *Shuangnao* character instruction in 1997, and began to integrate multimedia technology into the *pinyin* input pedagogy. The school developed a CD-ROM-based multimedia package, *Yuwen Dianzi Xueben* (Electro-text of Chinese Language for Primary Students), which consists of four modules: learning module, exercise module, writing module and information module. In addition to an inclusion of the electronic version of the textbook, the Learning Module provides the pronunciation of characters together with pictures and animations showing the structure of characters. It essentially plays the role of a teacher in giving students instruction on pronunciation, structure and meaning of characters and how they are encoded and should be typed as in the *Shuangnao* experiment. The interactiveness of the module allows children to learn the pronunciation of the initial and the final of a syllable and the pronunciation of characters by simply clicking on the corresponding part on the screen. The Exercise Module allows students to do exercises on the computer by inputting the answers using the *Shuangpin* method, and the computer will record students' performance in the process of typing, for example, speed, and percentage of correct and incorrect input and give feedback on the students' performance. When students encounter problems in inputting a character into the computer, they can just click on the help button and the computer will give the correct pronunciation and show how the character is encoded. The Writing Module lays more emphasis on students' writing skills based on the students' learning of how to input characters using the *Shuangpin* input method. Students can use this module to create word combinations and sentences, and write stories by typing them into the computer. The Information Module provides information related to the content of electronic textbooks for students' reference. Students can read and choose what they want to supplement their study. As shown later, the adoption of multimedia technology contributed much to the efficiency of character teaching and learning. Since the computer program fully takes into consideration the students' need and provides text, sound, pictures and animations, students are more likely to engage themselves into literacy learning, which in turn contributes to the success in literacy learning.

In summary, the *Shuangpin* input experiment integrated the learning of *pinyin*, Chinese character and character input method with one reinforcing the others. Since the method does not require writing characters, it is possible for students to concentrate more on recognizing characters and thus a large number of characters can be learned for early reading purpose. Also students can write on the computer without being constrained by having to write characters with hand. Finally, the use of multimedia package offers a chance for students to learn independently. They can use the computer program to suit their own needs for individual learning.

Experiment Results

It was found that in the pedagogic experiment, students learned to recognize Chinese characters faster and to write compositions earlier with the aid of computer (Zhou, 1998, 1999). On the one hand, students can recognize a large number of characters and read story books earlier because the method does not emphasize on

character writing, which is the most difficult for beginning learners. On the other hand, the combination of text, sound, graphics and animations enables the program more interesting to students in literacy learning. When they find they can type-write what they want to say with the help of the computer and the input method, they become much interested in Chinese language learning.

The experiment also proved to be very effective in facilitating the recognition of characters. The results of the 1997 experiment show that students taught with the new method can in the first 10 weeks learn to recognize on average about 1000 characters and to command *pinyin*. This is a remarkable achievement, since with the conventional approach of teaching *pinyin* in the first 8 weeks, students can only command *pinyin* without being taught any character. The experiment duplicated in the year 1999 shows that the average amount of characters that students can recognize reaches about 14 hundred (Zhou, 1999), far more than the 330 characters required by the official syllabus and learned by students with the conventional approach in the same period of time. The effect of the method was also proved in the duplicated experiments in a variety of schools around China (Zhou, 1998, 1999). The 1997-experiments in two primary schools, one in Jiangsu province and the other Guangdong province, also yielded remarkable results. The students of the experiment can recognize about 800 characters in the first two months. The effect was again confirmed in experiments duplicated in a primary school in Henan province in central China (Zhou, 1999). The report shows that primary 1 students can on average recognize about 1000 characters in the same period of time.

This method has also been proved to be effective in developing early writing skills. Normally, most Chinese children cannot write anything when they first start their formal schooling. With the help of computer and using the *Shuangpin* Input Method, they can type characters learned into computer instead of hand-writing them. Some students can input more than 600 characters and 96 sentences into the computer after being taught with the method for one and a half months (Zhou, 1999; Yao, 2003). They can also type what they want to say into the computer to write compositions within a year. For some students who have already been trained to recognize about 1000 characters before their formal schooling can write stories on the computer after a few weeks' instruction of the *Shuangnao* experiment, although they don't know how to hand-write these characters (Zhou, 1999).

Moreover, students' digital literacy in terms of inputting Chinese characters was improved. As noted earlier, the main feature of the *Shuang Nao* experiment is that learning *pinyin*, recognizing characters, and developing computer literacy are combined, with one reinforcing the other. For example, through learning the *Shuangpin* encoding method, students' knowledge of *pinyin* of corresponding characters is enhanced, and this in turn contributes to the efficiency of character input into the computer. In addition, when typing characters into the computer, students' recognition of the characters is reinforced. After two months' training on primary students using the *Shuangpin* Input Method, it was found that students can on average input more than 20 characters into the computer in one minute, the highest speed of character input is 42 characters per minute (Zhou, 1999).

As shown above, these experiment studies have yielded significant findings. By using certain features of ICT as intervention tools, these studies have proved to speed up the development of children's early literacy in one way or another. At the same time, they have facilitated children's electronic literacy at a very early age. We agree with the researchers' claim that appropriate use of computer technologies can maximize the effect of Chinese literacy instruction. This is also true with the teaching of Chinese language in other countries. In Singapore, for example, the teaching of the Chinese language has long been a hot topic and received much public attention, but one of the barriers to successful learning of the language is the complicated structure of

Chinese characters. The writing of characters always poses difficulties for Singapore students in their learning of the Chinese language. In turn, they find the language difficult to learn and lack interests in and motivation for learning the language (Cheah, 2003). The computer has been proved to be an important tool for facilitating the teaching and learning of Chinese language. We assume that the *pinyin* input pedagogy discussed here has important implications for the teaching of Chinese language in the Singapore context.

Implications for Chinese language education in Singapore

In this brief review we have provided the background and an appraisal of the work done on the *pinyin* input approach of teaching Chinese to Chinese children during their initial years of schooling. After discussing briefly what the input methods are, we have briefly illustrated how the input methods are employed in early Chinese literacy instruction. In the illustration, we have discussed the main assumptions, teaching principles and results of the input methods experiments. To conclude, we highlight some key points of the approach and explain its success further, as this has implications for designing new Chinese curriculum and pedagogical practice currently undertaken in Singapore.

From the above illustration we can see that the success of the approach lies basically in the use of *pinyin* input method, which allows children to input characters into computers and at the same time to reinforce their learning of *pinyin* and the awareness of the structure of character. The feature of integrating the learning of *pinyin*, character and digital literacy is unique as compared to the conventional literacy teaching pedagogy. It is also important to emphasise that the approach is not, as is the practice of the conventional way of character teaching, based on the teacher-dominant classroom instruction. It offers an opportunity for more individualized learning and gives students more freedom to use the multimedia package to suit their own learning needs. One key concept of the approach is to not let students' limitations in mastery of character writing—a requisite “gatekeeper” to early literacy – get in the way of their training in reading, listening and speaking. More importantly, the emphasis is on helping children to pick up characters implicitly through *pinyin* input while also teaching them basic input skills and character recognition systematically. In this way, different learning points are integrated to strengthen each other rather than separated with one being independent of the other. The difference from the conventional pedagogy is that computer both as a facilitative tool and as an objective of learning is well integrated. Conventionally, *pinyin* is learned first for “early reading and writing” purposes (see Liu, in press for a review), however, in the *pinyin input* approach, the learning of reading and writing is conducted in a more efficient manner. Instead of learning *pinyin* first, and then with the help of *pinyin* annotation to read stories and write in *pinyin*, the *pinyin* input pedagogy at the initial stage of the experiment put much emphasis on learning how to read and input characters, which prepares for early reading and writing on computer.

Although the success of the approach lies basically in the use of *pinyin* input method, it can also be partly attributed to the extensive reading and the use of the multimedia package encouraged by teachers. Since simplified reading materials are provided for the students to practice reading extensively and quantitatively, students have the chance of much exposure to all the characters learned. Also because of the fun they get from reading story books, students may find Chinese learning interesting. Their motivation for and interests in learning the language will be encouraged, which in turn contributes to their success in literacy learning. Another key point is that the approach allows the teacher and students to be more flexible in terms of teaching and learning.

Pedagogically, the *pinyin* input pedagogy also has implications for the teaching of Chinese in Singapore. In Singapore, as noted earlier, the challenges of overcoming the initial difficulty of learning Chinese characters and of encouraging and sustaining students' motivation for and interest in learning the Chinese language are two separate but related salient issues that are recurrent in debates among community members, curriculum designers and teachers. For example, these two issues often assume a kind of cause-effect relationship: Chinese characters are more difficult to learn and therefore students' motivation for and interest in learning the language are weaker (e.g., Cheah, 2003). As shown earlier, this commonsensical observation is one of the reasons why the reform is initiated, and therefore, we assume that it is applicable in the Singapore context. Instead of the current direct confrontation with the difficulty of learning Chinese characters at the initial stage of learning, *pinyin* input approach to Chinese literacy development illustrated in this article can not only facilitate the student learning of how to read earlier but indeed help sustain students' motivation for and interest in learning the language. We believe that students' sustainable motivation for and interest in learning are more important in contexts such as Singapore's, because the Chinese language is neither a medium of instruction in schools there, nor a dominant means in government and business communication. Consequently, students' learning motivation and interest are more vulnerable than their counterparts' in China.

However, we are not asserting, without qualification, that the approach can be directly translated to the Singapore context. For example, a factor crucial for its success is the way it encourages and enables children with limited mastery of characters to read extensively. The prerequisites are that there should be sufficient computers available to children and that Chinese teachers have sufficient training and knowledge of these approaches. We would assume that the children's rapid progress in character recognition also has much to do with the extensive and quantitative reading they have every day either in school or at home. In China, standard Chinese is the dominant language used in school instruction, social communication and media. In the context of Singapore, however, the situation is different. Although Chinese is legitimized as one of the official languages, its use is very limited, especially its written form. In Singapore, English is the major medium language for school instruction and social communication. Since they have an easier alternative, children may not be as willing as their counterparts in China to read Chinese either with books or on the screen. Such context-specific problems should be taken into deliberation whenever a successful approach is being considered for implementation in different contexts. Nevertheless, this approach, which has been subjected to experimental examination for a decade, provides an alternative in which we can consider how to teach Chinese language more effectively. While acknowledging that a successful approach in one context may not necessarily be so in another, the information provided here can at least shed some light on Chinese language curriculum design and pedagogic practice in Singapore.

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