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Literacy instruction in primary level deaf education in China

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ABSTRACT

The national policy in deaf education in Mainland China primarily focuses on oral/aural instruction and hearing rehabilitation. The curriculum in primary grades is specifically structured on speech and hearing skills for language development. But there is little evidence that documents what early literacy instruction looks like or how teachers conduct the teaching of reading and writing in classrooms with Chinese deaf children. By analyzing videotapes from the first and second grade classrooms, we describe how reading and writing are taught to deaf children in China. The key findings are that the primary grade literacy instruction (1) shares features of Gradual Release of Responsibility model with a focus on speech and hearing skills; (2) uses multimodal strategies and pedagogical tools such as lip-reading, Pinyin phonetic symbols, Pinyin Finger Spelling, Chinese Sign Language (CSL), and Signed Chinese (SC). Moreover, the curriculum reflects low expectations for deaf students as it lacks the academic content provided to their hearing peers. We conclude with implications for literacy instruction in deaf education, and suggest a future research agenda.

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Reading and writing represent a major avenue for deaf¹ persons to communicate, to access information as well as to participate in society. Thus, the importance of teaching early literacy to deaf students for education, health, leisure, career, and civil rights benefits cannot be overstated. Specifically for deaf children, early literacy skills lay the foundation for the acquisition of more complex skills (Lederberg *et al.* 2014).

China has the largest population of deaf children in the world (2010 National Bureau of Statistics of the People's Republic of China). According to the statistics provided on the China Disabled Persons' Federation (CDFP) website (2006), there are approximately 21 million people with hearing loss, of which about 120,000 are elementary-aged students who are enrolled in either public schools or special education programmes. Recently, literacy instruction and practices with deaf learners in China have received increasing attention (Fung *et al.* 2005, Chow *et al.* 2008, Jones 2013). In light of the importance for a better understanding of literacy learning, this paper describes current practices in literacy instruction for Chinese deaf students in primary grades. The findings are interpreted within the context of current policy, research, and practice in China (Wu *et al.* 1999, Wang and Anderson 2010).

Contemporary deaf education in China

Similar to their hearing peers, deaf children begin school at age 6 or 7 for 9 years compulsory education,

according to the Education Law of the People's Republic of China passed in 1986. Deaf children age birth to 6 years old and their families can receive services from the CDPF organization in each province through the China Rehabilitation and Research Center for Deaf Children (CRRCDC). They are eligible to receive rehabilitation training starting at about age 2 (Liu and Raver 2011). For children under 2, home-based early intervention programmes are available in some areas (Yang *et al.* 2015). The training approach in the rehabilitation centres emphasizes 'hearing' recovery and oral/aural (O-A) rehabilitation. Children learn how to talk with hearing teachers through imitation. Sign language is not encouraged maybe because the expectation is to have the deaf children learn to speak only.

Children who have 'successfully' completed a programme of oral rehabilitation under CDPF are mainstreamed in regular schools with little or no support services. Almost all other children, including those with moderate to profound hearing losses, are educated in special schools (Lytle *et al.* 2005).

Beginning from 1999, Universal Newborn Hearing Screening (UNHS) has been introduced to China. With the government's support, UNSH has been rapidly established and spread to 20 out of the 32 provinces by 2012. It is noted that about 95% of newborn babies in the major urban cities are screened at the hospital. In the rural areas, babies with high risk factors are referred for hearing screenings within 1 month of birth (Liang and Mason 2013). Besides

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¹In this paper, we use the generic term deaf to designate students with a hearing loss so severe that they are not able to benefit from placement in the general education classrooms.

UNHS services, China has been participating in programmes for genetic screening for deafness-susceptibility in newborns that helps further identify children with congenital hearing loss (Dai *et al.* 2007, Xin *et al.* 2013).

The deaf education programme in China has its own curriculum; however, the instructional methodology is similar to that prescribed for all elementary school children without disabilities. It emphasizes skill and drill through memorization, with a focus on speech and hearing. The instructional style can be described as 'teacher centred' which focuses on direct instruction by the teacher with little participation from the students. As with hearing children in China, there is limited literacy learning through authentic experiences and children's literature. Instead, the textbook emphasizes moral education reflective of the values embedded within the Communist Party.

Oral (spoken)/aural (listening) approach

The national policy for the education of deaf children in China primarily focuses on an O-A approach (Lytle *et al.* 2005, Yang *et al.* 2015). The O-A approach aims to develop speech and listening skills with residual hearing by teaching with spoken language, the use of hearing devices, and cochlear implant technology. The goal is to ultimately integrate deaf children into regular education classrooms. The O-A approach also emphasizes reading and writing as well as utilizes visual cues as lip-reading or speechreading (Northern and Downs 2014).

Most schools use oral communication supplemented by sign language and fingerspelling. Similar to the sign languages in the West, a distinction exists between the natural sign language of China (CSL) used by the deaf community and Signed Chinese (SC), which uses Chinese Sign Language (CSL) lexical signs in the grammatical word order of spoken Chinese. SC (also known as sign supported speech) does not use other linguistic features of CSL such as facial and body movement, verb agreement, classifiers, and aspect markings (Fischer and Gong 2010).

The O-A approach was historically introduced to China by two American missionaries from Rochester, New York (Charles and Annette Mills) in 1887 when they established the first school for the deaf in Shandong (山东) province (Fischer and Gong 2010). The Mills couple was influenced by the International Conference of Milan in Italy where oral education was supported over manual or sign language in the 1880s. They were also influenced by the use of fingerspelling as their deaf nephew attended the Rochester School for the deaf where speech and fingerspelling (Rochester Method) were commonly used (Smith 1986, Yong 1986).

A variation of the A-O approach is called the Auditory-Verbal (A-V) method. The A-V method prioritizes

the acoustic channel as the primary input and one technique is to cover the mouth of the speaker (instructor) so the child can develop listening skills (Northern and Downs 2014). The strict adherence to O-A approach has changed since 2007 after the National Ministry of Education in China had officially promulgated flexible teaching methods to meet the diverse needs of every deaf child (Liang and Mason 2013).

In recent years, there are emerging number of experimental classrooms adopting sign-bilingualism, and a student-centred approach under the influence of Western deaf education philosophy (Yang 2008). At the other end of the spectrum, there have also been efforts to develop teacher-training courses in the A-V method by CRRCDC in collaboration with Australian and Taiwanese speech and language professionals (Liang and Mason 2013). These efforts, though small in numbers, demonstrate innovation in deaf education in China.

Chinese writing system

For readers unfamiliar with the Chinese script, a brief summary is presented here with links to how it impacts literacy learning with deaf children. Different from alphabetic English, Chinese is morpho-syllabic in which the basic writing unit, character, corresponds to a syllable and a morpheme. The Chinese orthography consists of thousands of visually complex characters. Characters are individual and pictographic in shape. The elemental unit in a Chinese character is the stroke. A stroke is written in one continuous movement using a writing instrument. Among the 3,500 common characters listed in the Modern Chinese Dictionary (2012), the majority of Chinese characters have 6–13 strokes. The number of strokes in a character indicates its visual complexity. The most complex character has 57 strokes 𪛗 (a type of noodle), while the simplest one has only one stroke, 一 (one).

Teachers demonstrate to deaf children how to form the strokes because learning strokes is the key to memorizing characters. The strokes are traditionally classified into eight basic forms, 点 (A simple dot), 横 (Horizontal stroke, left to right), 竖 (Vertical stroke, top to bottom), 撇 (Diagonal stroke, falling from right to left), 捺 (Horizontal stroke, falling from left to right), 提 (Diagonal stroke, rising from left to right), 折 (Turning, left to right down 90 degree), 勾 (Hook appended to other strokes). Deaf children learn stroke orders since the first grade. Writing characters in the correct order is essential in word learning/instruction. The basic rules in teaching stroke orders are as the following: (1) Top before bottom (从上到下); (2) Left before right (从左到右); (3) Horizontal strokes before intersecting vertical strokes (先横后竖); (4) Left-falling strokes before right-falling strokes (先撇后捺); (5) Centre stroke before wings (先中间后两



Figure 1. Chinese stroke types (<http://www.hjenglish.com/kouyu/p228399/>).

边); and several other additional rules. The majority students can quickly acquire a natural feel for the proper stroke orders following these rules (Figure 1).

Most Chinese characters have two parts written as top and bottom or left and right combinations. Deaf children learn to recognize Chinese characters by encoding perceptual chunks, corresponding to recurrent patterns of strokes, such as 扌 (hand), 氵 (water), 艹 (plant). The Chinese writing system is visually complex. Research with hearing children has found that skills in visual analysis are important in learning to read and write (Anderson *et al.* 2013).

Chinese characters can be simple or compound. Simple characters are not divisible into components whereas compound characters have two or more components. About 72% of the characters in Chinese are semantic-phonetic compounds composed of two parts: a semantic radical that gives a clue to the meaning, and a phonetic radical that provides a clue to pronunciation (Shu *et al.* 2003). For example, the character 妈/mā/ (mother) consists of the semantic radical 女 (female) and the phonetic radical 马/mǎ/. Written Chinese contains about 200 semantic radicals and 800 phonetic radicals (Hoosain 1991). Chinese compound characters are formed from combination and recombination of these components, similar to English using 26 letters to combine and recombine in order to form words. It is a common practice for the teachers to utilize the radicals to teach how to access the meaning and pronunciation of new characters in deaf classroom.

Aim of the study

The question that guided this inquiry is the following: how do teachers conduct the teaching of reading and writing in classrooms with Chinese deaf children? Through a descriptive analysis of two cases videoed in the first and second grade classrooms, this study documents the strategies and pedagogical tools used by the teachers. It is noteworthy pointing out that China is a melting pot of people from more than 56 ethnic backgrounds (Dai *et al.* 2007), and our paper barely scratches the surface for language learning and cultural issues surrounding deaf students. Nonetheless, we see this study as a useful case to identify core issues in the teaching of early literacy with deaf children in the primary level.

Methodology

Setting

The study was conducted in a Special Education School in a city located in the Northeast part of Mainland China. The city is the second largest one in its province. It has about 1.5 million permanent residents, with an additional 5.7 million people in the surrounding suburban areas (2016 National Bureau of Statistics of the People's Republic of China).

The school was founded in 1960 for deaf students only, but renamed as a Special Education School in 1992. It currently enrolls about 140 students who are diagnosed as blind, deaf, autistic, cognitively disabled, or children with multiple disabilities (e.g. cognitive, emotional, learning, and/or physical). There are 16 classes, 52 staff, of which 48 are full time teachers. About 75% of the teachers completed college level training in special education programme from the 'normal' teacher preparation universities, where the emphasis is on caregiving and vocational training. Deaf education as a preparation area does not exist in Mainland China (Lytle *et al.* 2005). All the teachers working with deaf students are hearing and they have learned sign language after they were hired. All deaf students enrolled in school are eligible to receive hearing aids granted by the government free of cost (Liang and Mason 2013).

Both classrooms we videoed are equipped with a big blackboard on the front wall. A TV is mounted on the left top corner that is hooked to the computer on the teacher's desk. Above the blackboard, there is a large printed Chinese idiomatic phrase 好好学习, 天天向上 (study hard and make progress every day) by Chairman Mao Zhedong (毛泽东). No other visual images such as pictures, posters, drawings, or written displays of students' work are found in the room.

The use of space differs in first versus the second grade classroom. In the first grade classroom, the six desks are arranged horizontally to the front where the teacher and students have full visual access to each other's lip-reading, speaking, facial expressions, body language, and signing. However, in the second grade classroom, the five desks are lined up in two vertical rows with three desks in each row. This arrangement prevents students in the second row from full visual access to their peers' lip-reading and signing unless they turn around in their seats.

Narrative research approach

A qualitative narrative description was applied to detail the behaviours of two teachers while they taught literacy to young deaf children in two primary grade classrooms. The narrative approach provides a framework of reference in which to describe and reflect upon the classroom teachers' instructional practices (Moen 2006).

Participants

There were six students in the first grade class with four girls and two boys, and five students in the second grade class with four girls and one boy. Background information of each individual student was not collected because the focus was on the two teachers.

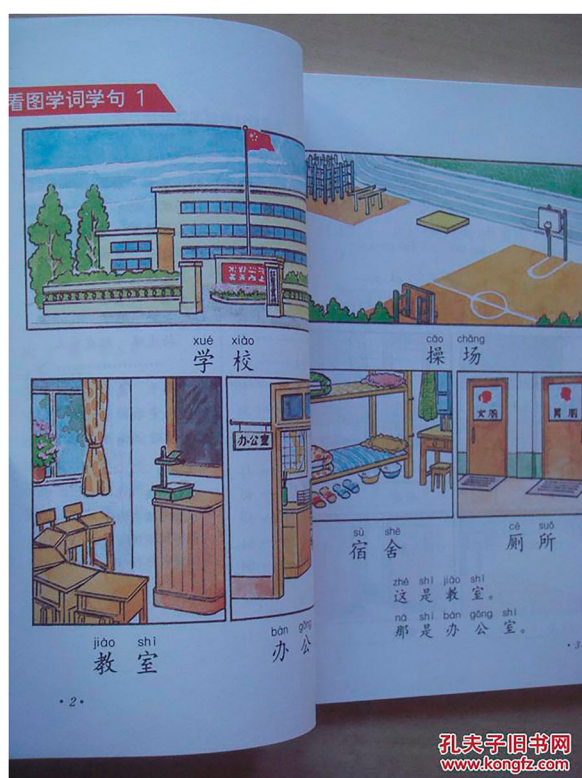
Curriculum/textbooks for literacy in deaf classrooms (全日制聋校实验教材语文)

The textbooks for literacy used in the classrooms for this study are the editions published by the *China Remin University Press* in 1997. The textbooks in primary grades (grades 1–3) have six volumes with two volumes for each grade level. Each volume has 16 lessons with each lesson comprised of three sub-lessons. During each week, 3 hours are allocated to literacy instruction. The primary emphasis is on spoken language and listening skills using visual aids such as illustrations. Volumes 1 and 2 mainly focus on

speech, words and short phrases. The textbook provides multiple illustrations to support students learning words and phrases about topics such as school, home, and everyday life. The focus of Volumes 3 and 4 is on students learning simple conversation through the supporting illustrations. Volumes 5 and 6 emphasize more on expressive skills where students are encouraged to use their own language to express their ideas and feelings.

Reading instruction across China tends to be uniform, because of the national curriculum guide, national textbook series, and common traditions of schooling. Drill-and-practice predominates in the teaching of characters. Chinese reading instruction emphasizes intensive reading, but neglects extensive reading. Intensive reading involves students reading texts in detail to practice specific skills and strategies, while extensive reading entails students reading a variety of texts for enjoyment (Bell 1998). This is similar in deaf education.

The load of learning new characters is greatest in the lower grades. Curriculum goals for the primary school mainstream classrooms include learning approximately 3000 Chinese characters. But the expectation for deaf students is much lower, about half of the amount of their mainstream peers. Figure 2 displays a sample of two first grade textbooks. On the left is the textbook sample for deaf students and on the right is the one for hearing children. The hearing children are given more print exposure than the deaf children.



28 丑小鸭

太阳暖烘烘的。鸭妈妈卧在草堆里，等她的孩子出世。

一只只小鸭子都从蛋壳里钻出来了，就剩下一个特别大的蛋。过了好几天，这个蛋才慢慢裂开，钻出一只又大又丑的鸭子。他的毛灰灰的，嘴巴大大的，身子瘦瘦的，大家都叫他“丑小鸭”。

hōng wò shèng liè
烘 卧 剩 裂



本文根据安徒生作品改写。

好孩子 儿童资源网
etongzy.com

Figure 2. A comparison of textbooks for deaf and hearing first graders (http://book.kongfz.com/item_pic_14239_492011371/).

Procedures for data collection

Two literacy lessons were videotaped in June by the researcher, near the end of the school year. With a professional Sony camera in hand, the researcher sat unobtrusively in the back row in the classroom for videotaping to avoid interrupting the lesson and distracting the students. For the first grade classroom, students were using Volume 2 (see Figure 2) and the second grade classroom was using Volume 4 of the textbooks. These are just two prototype lessons following China's mandated curriculum. While we cannot generalize to all classrooms for the deaf, we believe our two primary classes are fairly representative of how instruction is carried out in deaf education classrooms that follow an O-A approach.

Data analysis

Two literacy lessons (one in each grade) were videotaped, and then transcribed by a Chinese-English bilingual interpreter who is fluent in spoken Chinese, CSL, and English. The classroom communication conducted in Chinese was transcribed directly into written English for purposes of analysis. The two researchers analyzed the data based on teaching and learning behaviours, student and teacher interactions, as well as strategies used during the literacy lessons.

Findings

Two major findings emerged from this study. First, the teachers structured the literacy instruction into three parts: Before the Teaching Activity, During the Teaching Lesson, and After the Teaching Activity following the Gradual Release of Responsibility (GRR) model. Second, teachers used a variety of multimodal strategies and pedagogical tools.

Finding 1: the structure of 50-min literacy lessons

Part I first grade literacy instruction

Before the teaching activity (2 min). The teacher led the children in exercises by using spoken language as

well as hands and gestures as visual support for about two minutes that focused on practicing tongue and lip movements and breathing rhythm to get students ready for speech production. It is called 聋儿舌体、双唇、呼吸训练操 in Chinese, which is similar to oral-motor exercises used by speech pathologists in the US.

During the teaching lesson (35–40 min). The literacy lesson started with the teacher stating the learning objectives that were to look at the picture and learn vocabulary and sentences. The teacher wrote down the Chinese phrase 看图学词学句 (Look at Picture to Learn Vocabulary and Sentences) on the blackboard to remind students of the learning goals for the day.

The teacher then hung a picture on the blackboard and proceeded to teach the key vocabulary for the lesson, 鸭子/duck and 鹅/goose (see Figure 3 for duck). In the vocabulary teaching, we observed the teacher utilizing spoken Chinese and occasionally CSL. They also used pedagogical tools such as lip-reading, SC, visual aids such as pictures, questioning prompts (What is it in the picture), analogy (comparing semantic features of the duck and the goose), Pinyin Finger Spelling (see Figure 5), Pinyin writing (yā), palm writing, air writing, and character handwriting by stroke and components on a two-part lined grid (田字格) drawn on the blackboard (see Figure 3 below).

After pre-teaching the key vocabulary, the teacher proceeded to teach the meaning of a sentence from the textbook, 我家养了三只鸭/My family raises three ducks. The teaching strategies were multimodal, which included copying the sentence on the blackboard, analyzing its grammatical structure, word-by-word meaning explanations with spoken Chinese, CSL, SC, air writing, Pinyin Finger Spelling, etc. The teacher also modelled how to compose sentences using the grammatical structure, and then invited the students to generate their own sentences and write them down in their notebooks. Two students were invited to come to the blackboard and write down their sentences. For example, one student wrote 我家养了两只狗/My family has two dogs. The teacher



Figure 3. Using the picture to teach pinyin writing (alphabetic) and the Chinese character (logographic) for 鸭/duck.

encouraged her to use the vocabulary just learned, so she changed the sentence to: 我家养了两只鹅 / My family raises two geese. Other sentences that the students produced in their notebooks included these examples: 我家养了四只狗 / My family has four dogs; 他家养了一头牛 / His family raises a cow; 学校养了三只羊 / My school raises three sheep.

After the teaching activity (5 min). To provide more practice, the teacher assigned homework to students that required them to compose four sentences by using the grammatical structure and new vocabulary learned during the literacy lesson.

Part II second grade literacy instruction

Before the teaching activity (2 min). The teacher involved the children in an activity to demonstrate the meaning of a new word. She started the class by asking a girl student to pour the drinking water in cups for everyone in the classroom. The girl walked to the back of the classroom and found out that there was no water left in the thermos bottle. The teacher indicated with gestures and spoken Chinese to the girl to return to her seat as the teacher queried with a prompting question, 'Class, Ms. Dang forgot to fetch the water for our class. What does the word 'forgot'/忘了 mean?' The teacher demonstrated words and meaning using spoken Chinese with slow and exaggerated mouth movements so children could lip-read her. She also utilized SC and some CSL all the way through the lesson.

During the teaching lesson (40 min). After the scenario described above, the teacher transitioned into teaching a set of new words of the lesson. Using the same strategy of 'Look at the picture and learn the new words and sentences' (看图学字学句), the teacher taught the key words 忘了/forgot, 方明/name, 挂/hang, 墙/wall. Again, the teacher provided direct instruction on how to write, air write, sign, Pinyin fingerspell, and vocally pronounce these words using slow and exaggerated mouth movements for children to lip read.

Afterwards, the teacher hung up a picture on the blackboard as a prompt to teach the sentence '放学了, 同学们忘了关灯, 方明走进教室把灯关了' (School was over, the lights in the classroom were left on, Fang Ming walked into the classroom and turned off the lights).

The teacher then proceeded to analyze the sentence pattern into its major grammatical structures as '(subject) (predicate) (object) (place)' with the assumption that this explanation would help students internalize the grammatical rules. With more focus on sentence composition in second grade, the teacher used familiar school artefacts (e.g. pencil/pencil box; book/backpack) and picture prompts to guide students

with repetitive practices of sentence learning. Under the teacher's supervision, the students learned to generate the following sentences using the grammatical structure of (subject) (predicate) (object) (place):

- Miss Dang put the pencil in the pencil box (党老师把铅笔放进文具盒里).
- Miss Dang put the book in the backpack (党老师把语文书放进书包里).
- The girl put the schoolbag on the wall (女孩儿把书包挂在墙上).

After the instructional modelling with multimodal tools and strategies, the students practiced copying the sentences in their notebooks. The teacher approached each desk and examined students' work independently while providing correctional and motivational feedback.

After the teaching activity. After the lesson, the teacher commented that she was very happy and praised students for their good work. She then assigned homework to students to practice and copy the sentences they learned. She double-checked to make sure that students understood her directives. She further emphasized the importance of practice in learning and praised the students again. Before dismissing the class, she asked the students for confirmation that they understood the homework expectations.

To summarize, the teaching of literacy using the O-A approach in the Chinese deaf primary level classrooms emphasizes the instruction of vocabulary, sentence structure, and comprehension. The classroom environment is teacher-centred with abundance of imitation and drill practice, but there are consistent positive corrective feedback including praise and warm affects that are conducive to learning. Overall, the teachers used CSL to a lesser extent but instead focused on spoken Chinese. As an auxiliary support, we observed teachers using visual aids such as pictures and a variety of pedagogical tools derived from cross-modal language contact (e.g. SC, Pinyin, Pinyin Finger Spelling, air/palm writing and writing on the blackboard) (see Yang 2008, Fischer and Gong 2010 for discussion of effects of Chinese writing on the structure of CSL). Teachers focus on the mastery of a set of high frequency words as this strategy is believed to lead to good reading skills. However, it was observed in each case that only two to five new words were taught during the 50-minute lesson. Repetition was utilized often to enhance knowledge and learning in memory.

The overall framework of instruction follows the GRR model that features directed instruction, guided instruction, and independent practice as a scaffold to support students' learning (Pearson and Gallagher 1983, Duke and Pearson 2002). In Table 1 below we

Table 1. GRR model roles and responsibilities in primary grade classrooms.

GRR model	Teacher	Student
Direct instruction <i>I do it</i>	<ul style="list-style-type: none"> Establishes goals and objectives Provides visual support for tongue and mouth exercises (1st grade only) Directs visual attention to the blackboard Uses classroom situational context to teach vocabulary meaning (2nd grade only) Provides direct instruction of content words and function words Provides direct instruction of Pinyin and Pinyin Finger Spelling Models multimodal tools of CSL, SC, written Chinese, and spoken Chinese for instruction of vocabulary and sentence structure Increases use of SC and CSL as compared with the 1st grade class Teaches the structural analysis of character radicals (1st and 2nd gr) Uses teachers' background knowledge and experiences to teach concepts about animals (2nd grade only) Models airwriting of characters Fingerscans print and provides sign or Pinyin Finger Spelling equivalent Provides modelling and repetition Gives positive and corrective feedback 	<ul style="list-style-type: none"> Attends to teacher visually and auditorily Responds with imitation Visually attends to picture on blackboard (BB) Visually attends to teacher's writing on BB Responds with single words and short phrases in spoken language and SC (2nd grade only) Asks questions on how to write characters (2nd grade only)
Guided instruction <i>We do it</i>	<ul style="list-style-type: none"> Directs students' attention to picture, word, then sentence so they can speak, read, and write it Uses iconicity modelling to show signs Directs the students to reflect on previous learning with compare and contrast questions Increases dialogue with expanded sentences (2nd grade only) Directs students' attention to writing in grid on BB and then counts strokes with them (2nd grade only) Provides graphic boxes on BB for students to insert subject, verb, object (2nd grade only) Questions about students' comprehension Provides additional modelling and repetition Works with students individually Motivates students by encouraging them to continue practicing and showing effort (2nd grade only) Provides feedback on quality of writing (2nd grade only) 	<ul style="list-style-type: none"> Responds to teacher's questions and directives Works with teacher to pronounce words, learn sign equivalent, and learn Pinyin Finger Spelling alphabet equivalent. Imitates the teacher in learning how to make strokes in air and on BB with teacher support
Independent practice <i>You do it independently</i>	<ul style="list-style-type: none"> Provides feedback Uses multiple ways to evaluate students learning and progress Monitors the performance and understanding Uses familiar objects as props (i.e. <i>book, pencil</i>) (2nd grade only) Directs students' attention to the learning using the senses such as visual, tactile, and body language Warns the students not to be careless (2nd grade only) 	<ul style="list-style-type: none"> Works alone Relies on classroom learning to complete assignment Composes own sentences Practices writing vocabulary and sentences in notebook and on BB

summarize the roles and responsibilities of the teacher and students in the classroom.

Finding 2: multimodal strategies and pedagogical tools

Given that the national policy in deaf education is the O-A approach, we observed that the teachers used the following multimodal strategies and pedagogical tools to support this approach. Some of these tools (e.g. SC, character signs) are the result of language contact between CSL whereas other tools are the result of instructional techniques devised as needed (e.g. Pinyin, Pinyin Finger Spelling, lip-reading, air/palm writing). When persons come together who use two different languages, they often use a 'contact language' which is a naturally occurring blend of the two languages, or bilingual language mixes and other vernacular contacts (<http://www.linguisticsociety.org/resource/languages-contact>). We describe each tool in the below section.

Lip-reading

Lip-reading is a visual technique that helps deaf people understand speech by watching the speaker's mouth movements and facial expression (Northern and Downs 2014, p. 513). Lip-reading is recommended to use in combination with other tools for more effective communication. Chinese is assumed to be relatively difficult to lip-read because it is a tonal language that uses five tones to differentiate meaning, but each tone looks exactly the same on the lips. Throughout the lessons, the teachers were using repetition of words with exaggerated and slow mouth movements to assist lip-reading. Please note that factors such as low language levels, fatigue, lighting, facial hair, and protruding teeth can all obstruct lip-reading (Leigh and Andrews 2017).

Chinese Sign Language (CSL)

Like other sign languages worldwide, CSL has strong links to Deaf Culture in China (Yang 2008). CSL has a

different grammatical structure compared to spoken Chinese (Fischer and Gong 2010). Similar to American Sign Language (ASL), lexical signs in CSL shares the visual/gestural modality, iconicity and its sign meanings can be traced historically (Fisher and Gong 2010). Lexical signs in CSL can be segmented into sub-lexical or compositional parts based on these parameters: hand shape, location, orientation, movement, and non-manual markers (Fisher and Gong 2010). We observed that CSL was used sparsely by the teachers that we videotaped. Though CSL has been recognized as the language of the deaf community by the Chinese government, the National Guidelines for Deaf Education has proposed that teachers use 'spoken language as major means, and sign language as an auxiliary' (cited in Fischer and Gong 2010, p. 500).

Signed Chinese

SC is not a language but a communication system used for pedagogical purposes that places CSL lexical signs in a linear sequence that follows the syntax of spoken/written Chinese. Its purpose is to teach deaf children the vocabulary and grammar structures. The Chinese Deaf community does not use SC, but instead prefers CSL (Jones 2013).

Chinese character signs

Character signs are formed by two processes: depicting and tracing of the features from written Chinese (Fischer and Gong 2010).

Depicting signs

Depicting character signs are static visual representations of Chinese characters. Please see Figure 4 for examples of depicting character signs.

Tracing signs

It is also known as Air/Palm Writing. Deaf people use the index finger to draw the characters in the air or on the palm (Fischer and Gong 2010). In the videotaped lessons, we observed the teachers making frequent use of air/palm writing with children copying their modelling.

Pinyin

Invented around the 1950s, Pinyin is a phonetic system using the official roman alphabetic letters to transcribe sounds of written Chinese. It was adopted mainly to assist in teaching decoding skills for hearing children in the schools. Typically, children in Mainland China learn Pinyin in the first ten weeks at school before learning Chinese characters. Pinyin is then annotated on top of new characters/words in the reading textbooks (see Figure 2). We noticed that Pinyin was heavily used in character recognition and speech instruction with the deaf students.

Pinyin Finger Spelling

In China, Pinyin has a manual counterpart that is called the Pinyin Finger Spelling invented for deaf students (see Figure 5; Fischer and Gong 2010, Jones 2013). Deaf children use both the Pinyin written symbols and the Pinyin Finger Spelling to learn literacy from kindergarten through the elementary grades. We observed that the teachers frequently used and relied on the Pinyin Finger Spelling to teach character recognition and speech instruction.

Discussion and reflection

Professionals in deaf education need to further explore ways to set up optimal language learning environments for deaf students to acquire literacy. In the case of China, though the learning context is teacher-centred with drill practices. We also observed that students did not just passively attend to the teachers' instruction, but they were often invited to actively engage in class activities using multimodal strategies and pedagogical tools. We discuss our reflections below.

Eye-gaze, joint-attention, and visual attention

In the two classrooms observed, we noticed that both teachers frequently pointed to pictures on the blackboard and finger scanned print in order to direct students' visual attention. However, on several occasions, the teacher would turn her back to the students while still talking as she wrote on the blackboard, thus preventing

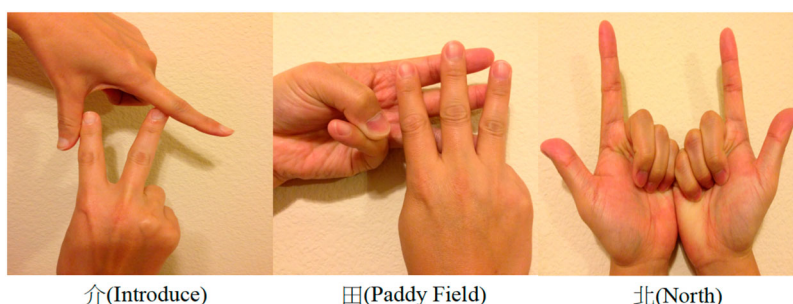


Figure 4. Examples of Chinese character signs (Ku 2015).

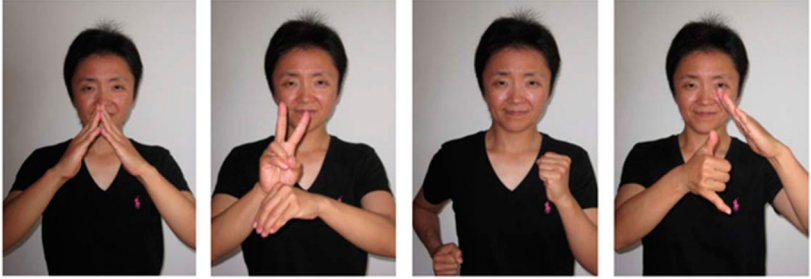

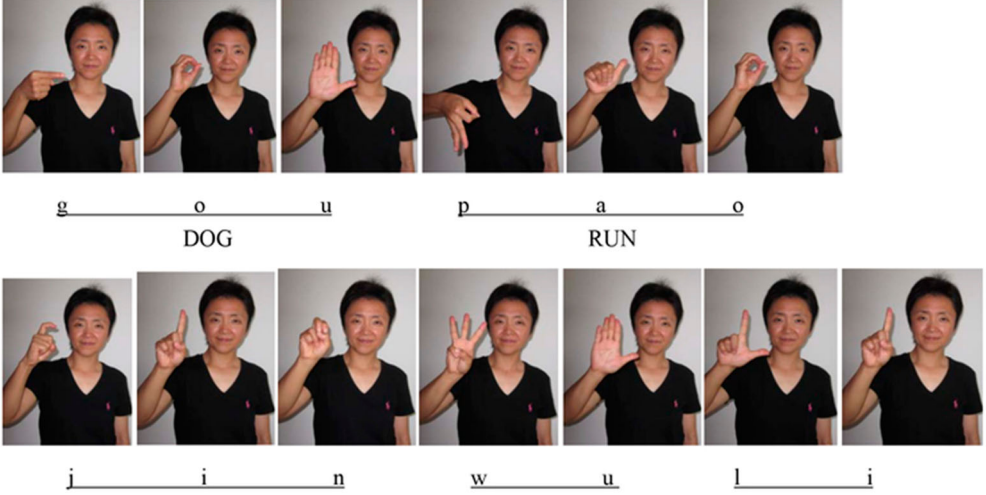
Written Chinese	狗 跑 進 屋子 裡。 DOG RUN INTO HOUSE INSIDE
Chinese Sign Language	 HOUSE DOG RUN CL-animal INTO HOUSE
Signed Chinese	 DOG RUN INTO HOUSE INSIDE
Pinyin Finger Alphabet	 g o u p a o DOG RUN i n w u l i INTO HOUSE INSIDE

Figure 5. The sentence 'The dog runs into the house' in Chinese Signed Language, Signed Chinese, and Pinyin Finger Spelling.

the deaf students from seeing her lips, facial expressions, and body language.

An important suggestion for these teachers is to make effective use of eye-gaze synchrony (Clark *et al.* 2015) and joint-attention strategies (Lieberman *et al.* 2011) to allow joint conversational turn-taking which is critical for social communication and language development (Clark 1996).

Use of deaf space

Classroom architecture and furniture arrangement can be barriers for visual deaf learners. In the first grade classroom, the desks were arranged in one row parallel to the teacher's podium. However, the seating in the second grade classroom was the lining up of two

rows, with one behind the other. Therefore, students in the second row could only face the backs of their classmates in the first row, which prevented peer communications through lip-reading, facial expression, body movement, and sign language.

A seating arrangement of desks in a semi-circle or a crescent moon-shape table is a more effective way to use deaf space (Horejes 2012). The concept of Deaf Space provides open visual access for the benefit of deaf students' sensory strength-vision (Byrd 2007).

Attention-getting strategies

In one of the videotapes, we observed that the teacher tried to get a deaf child's attention by grabbing his face. A more polite and gentle way to get a deaf

person's attention would be to use appropriate attention-getting strategies preferred by deaf people such as making eye contact, waving the hand in the person's visual field, tapping lightly on the shoulder, flashing the overhead lights, or tapping lightly on the table where someone is sitting (McKee *et al.* 1991).

Early exposure to Chinese Sign Language

Studies show that the key factor for deaf children's acquisition of literacy is early and full access to a language whether it is auditory or visual (Goldin-Meadow and Mayberry 2001, Mayberry *et al.* 2011, Pénicaud *et al.* 2013). Based on our videotape analyses including the written transcriptions, CSL was used sporadically and in a limited fashion. Instead, the development of spoken and written language was emphasized. Deaf children can benefit from early exposure to both CSL and spoken Chinese to take advantage of the sensitive period for language acquisition [see reviews in Humphries *et al.* (2014) for summary of early acquisition ASL studies in U.S.].

Expanding the use of Chinese Sign Language in primary literacy lessons

The teachers frequently incorporated lexical Chinese signs in their lessons to support spoken language and literacy development. However, they minimally used CSL grammar when doing so. Instead, the signs were placed in spoken Chinese grammatical order. Ample research evidence has shown that early ASL acquisition facilitates the development of literacy for deaf children in the U.S. (Freel *et al.* 2011, Allen 2015, Clark *et al.* 2016). We suggest that practices using CSL grammar at the story level could be set up and evaluated for their effectiveness in the teaching of Chinese literacy.

We assume that focusing on spoken language alone may not be sufficient. We have no objection to spoken language training, or the use of hearing technologies, nor do we reject auditory phonological training such as the use of Pinyin symbols and speech instruction. When used properly, auditory phonological training can be useful with other strategies at different times for a deaf learner, particularly if the child has already developed a solid visual language through signing. Thus, a bimodal/bilingual intervention is recommended to be further explored to maximize deaf students' access to both spoken language and CSL.

Watered-down curriculum

Low expectations were a concern throughout the videotaped lessons. In the first grade classroom, a full hour was spent on teaching two words, *duck* and *goose*, and a simple sentence structure. In the second grade class the teacher expanded the lesson to

include several more words and sentence structures. From our observations, it is obvious that deaf children were using a textbook with significantly simplified language input as compared with their hearing counterparts (see Figure 2).

Low expectations may be a result from the requirements set up by the national curriculum in deaf education, or it could be the underestimation of the cognitive and language abilities held widely by the hearing world. This self-fulfilling prophecy has been echoed in a monograph in 1980s in the West '... deaf education in the U.S. has come to expect that deaf children cannot perform as well as hearing children and has structured itself in ways that guarantee that result' (Johnson *et al.* 1989, p. 15).

Deaf teachers: appropriate language and socio-emotional models

All the teachers working with deaf students in the school where we videotaped are hearing and they had learned sign language after they were hired. Even today, prospective teachers of deaf students in China are mainly hearing people trained in generic special education programmes. There are limited universities offering a specialization in deaf education. The importance of deaf teachers in deaf education is well documented in research in China deaf education (Yang 2006, Jones 2013). Deaf teachers have the advantage of communicating effectively with the deaf student, and can more fully understand what the deaf student is signing/saying to them even though the student may have underdeveloped language skills.

We recommend that deaf education programmes hire more deaf teachers to provide appropriate language role model, which in turn will increase the content load of the curriculum in order to raise the level of expectations. There are also socio-emotional benefits of hiring deaf teachers. For instance, they have firsthand experience of being deaf. They have experienced the barriers that society often presents them and can teach young deaf students how to cope in the hearing world, just to name a few (Holcomb 2013).

A balanced approach to teach language and literacy

The O-A approach we observed is similar to the Situational Language Teaching (Oral) Approach used with second language learners, which focuses on the mastery of key vocabulary presented in structured lessons within real-life situations (Rhalmi 2009). For example, the second grade teacher introduced the new vocabulary 'forgot' in an everyday classroom scenario. Afterwards, the word 'forgot' became the focus of the lesson that was taught through the repetition of

speech and the drill practice in writing. To teach the sentence structure, the teacher provided a graphic aid by drawing three rectangular boxes on the blackboard in a line and asked the children to write in the subject, predicate, and object using the word, *forgot*. The O-A approach in deaf education in China also shares some features of the structured approaches in deaf education in the U.S. such as the Fitzgerald Key and the Apple Tree Program in the 1960s through the 1980s (Paul 2009).

We suggest that providing the child with interactive dialogues, a basic tenet of the Interactionist approach (Rumelhart 1994, Chapman 2000) can be explored in the classroom with deaf children. Through interactive dialogues with adults, children can internalize the grammatical structures through conversations rather than solely depending on drill practice.

Teaching comprehension can also be accomplished by having deaf children read more storybooks. By increasing the volume of reading, teachers can work with students on comprehension strategies such as finding the main idea, summarizing, monitoring, and so on. Increasing the volume of reading has found to be an effective literacy strategy by researchers working with Chinese hearing children (Wu *et al.* 1999, Wang and Anderson 2010). Research with U.S. deaf children who have low levels of sign language and English are found to be able to comprehend simple, easy-to-read picture books with familiar topics (Andrews *et al.* 2017). This approach of using storybooks can be adapted and implemented with Chinese deaf children.

Suggestions for future research

Limited research has addressed the role of deaf teachers as cognitive, socio-emotional, and linguistic role models for young deaf children. More studies are also needed to include teachers with diverse backgrounds. Other studies may examine the efficacy of CSL/Chinese bimodal/bilingual approaches. The expansion of shared storybook reading practices may also yield rich data. Furthermore, it would be productive to examine how parents impact their child's home and school language and literacy achievement. Finally, longitudinal studies are needed to investigate how deaf children learn to read and write Chinese, particularly the role of Pinyin knowledge in this process.

Disclosure statement

No potential conflict of interest was reported by the authors.

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