

Literacy and Deaf Students in Taiwan: Issues, Practices and Directions for Future Research: Part I

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We describe the literacy issues facing young deaf and hard of hearing (DHH) learners in Taiwan who are learning both a logographic and an alphabetic script. We describe the contextual factors that surround their reading and writing processes such as island demographics, reading achievement levels, and background language learning variables including deaf culture. We then describe and provide graphic illustrations and examples of the linguistic features of the written languages that DHH children are learning (Chinese and English) as well as the sign codes (Signed Chinese, Zhuyin finger alphabet, character signs, palm writing, and air writing) and the Zhuyin Fuhao written visual symbols. We suggest that contextual, cultural and linguistic factors need to be considered in the understanding of how DHH children learn to read and write as well as how they use their sign language and sign codes to build Chinese and English literacy skills.

KEYWORDS deaf, hard of hearing, deaf education, literacy, Taiwanese Sign Language, Chinese, Deaf Culture

Introduction

The process of learning to read and write a logographic script by deaf and hard of hearing (DHH) children from hearing families in Taiwan is not well understood.

All three authors prepare teachers and educational leaders of deaf and hard of hearing students.

Such knowledge can potentially inform our understanding of how DHH children learn literacy. While DHH children have limited access to auditory language, nor do they do not have access to phonemic awareness as hearing children experience it, with many being deficient in a sign language, still they learn to read (Schick et al., 2006; Liu, 2006; McQuarrie, 2008). Indeed, despite such auditory and visual language deficiencies, DHH children have been reported to use what sign they do know to learn to read an alphabetic script in the U.S. (Andrews & Mason, 1986; Musselman, 2000; Goldin-Meadow & Mayberry, 2001; Gerner de Garcia, 2003; Haptonstall-Nykaza & Schick, 2007; Andrews, 2012) and in the UK (Brennan, 2001; Swanwick & Watson, 2007) and to learn to read a logographic script in Taiwan (Liu, 2004; Liu et al., 2006). Additional descriptive and observational studies of signing Taiwanese DHH children learning to read and write have practical importance too as they can lead to the design of innovative interventions based on observations of young DHH children's literacy behaviours.

The purpose of this paper was to describe the issues facing young DHH learners of literacy in Taiwan who use the visual language of sign to support their learning of Chinese reading and writing, to observe classrooms of literacy teaching and to query teachers about their practices. In Part I, we examine contextual issues we believe surround the reading process such as island demographics, reading achievement levels and background language learning variables including deaf culture. We then describe the linguistic features of the written languages that DHH children are learning (Chinese and English) as well as the sign codes (Signed Chinese, Zhuyin finger alphabet, character signs, palm writing and air writing) and the Zhuyin Fuhao written visual symbols. These are the visual languages and tools used by teachers to bridge meaning from sign or hand cues to script. Signed Chinese is the rendering of signs derived from Taiwanese Sign Language (TSL) upon which the user places them in Chinese grammatical order (Smith, 2005). And Zhuyin Fuhao is a set of simplified characters that are used to represent the initials (onset) and finals (rime) syllables of the Chinese language. It does not use a Roman alphabet (Taylor, 2002). The Zhuyin finger alphabet is a system invented by educators that utilises a set of handshapes that correspond to the Zhuyin Fuhao written symbols, which as we described above represent the sounds of Chinese spoken language (Smith, 2005) (for examples, see Figures 1–4). Using this contextual information as a foundation, in Part II, we move on to describe current classroom practices and recommend future directions for research.

To our knowledge, there have been only a few studies that have investigated these issues surrounding signing DHH children learning literacy in Taiwan (Liu, 2004; Liu et al., 2006). To expand on this meager knowledge base, we used a narrative, descriptive approach and gathered information, informally talking to teachers, administrators and members of the deaf community. We also observed classrooms of teachers working with DHH children during literacy teaching. Collectively, we spend approximately 25 hours of observation in classrooms and about 15 hours of informal interviews of ten teachers, five administrators, five parents, and five

IPA	Zhuyin in	Zhuyin in finger	IPA	Zhuyin in	Zhuyin in finger	IPA	Zhuyin in	Zhuyin in finger	IPA	Zhuyin in	Zhuyin in finger
Onsets											
p	ㄅ		p ^h	ㄅˊ		m	ㄇ		f	ㄈ	
t	ㄊ		t ^h	ㄊˊ		n	ㄋ		l	ㄌ	
k	ㄎ		k ^h	ㄎˊ		x	ㄒ				
tɕ	ㄐ		tɕ ^h	ㄐˊ		ɕ	ㄑ				
tʂ	ㄑ		tʂ ^h	ㄑˊ		ʂ	ㄒ		ʐ	ㄑ	
ts	ㄗ		ts ^h	ㄗˊ		s	ㄗ				
Rimes											
a	ㄚ		ɔ	ㄛ		ɤ	ㄜ		ɛ	ㄝ	
aɪ	ㄞ		eɪ	ㄟ		aʊ	ㄞ		oʊ	ㄟ	
an	ㄢ		ən	ㄣ		aŋ	ㄤ		əŋ	ㄤ	
ə̃	ㄥ										
i	ㄟ		u	ㄨ		y	ㄩ				

FIGURE 1 IPA (International Phonetic Alphabet), Zhuyin Fuhao phonetic written symbols, and Zhuyin finger alphabet.

Deaf community members. We also kept field notes of our observations and interviews and used digital photography and movies to capture what we saw in the classrooms. Finally, we read existing literature on the topic. See Appendix for a copy of the questionnaire that guided our interviews and observations.

Contextual issues

Demographics

Compared to the U.S. and China, Taiwan is a relatively small island with 23 million people, of which approximately 119,185 are DHH (Ministry of Interior, 2011). The U.S. has approximately 314 million people (Census, 2012) and approximately 500,000 Deaf Americans who consider themselves part of deaf culture (Leigh,

Written Chinese	貓 跳 到 樹 上。				
	CAT JUMP TO TREE UP.				
Taiwan sign language					
	TREE	CAT	CL-animal JUMP to TREE		
Signed Chinese					
	CAT	JUMP	TO	TREE	UP
Zhuyin and IPA	ㄇ ㄞ	ㄉ ㄞ	ㄊ ㄞ	ㄩ ㄞ	ㄩ ㄞ
	m aʊ	t ^h i aʊ	t aʊ	ɕ u	ɕ aŋ
Zhuyin finger alphabet					
	CAT	JUMP	TO	TREE	UP

FIGURE 2 The sentence 'The cat jumps up the tree' in Written Chinese, English, Taiwanese Sign Language, Signed Chinese, Zhuyin, and Zhuyin finger alphabet.

2009). In contrast, mainland China has a total population of 1.3 billion people with 20.57 million being DHH (Yang, 2010). In the UK with a population of about 62 million people, it has been estimated that there are 23,000 to 25,000 DHH students below 15 years of age and that the rate of prelingual deafness is 13 in every 1000 children (Royal National Institute on Deafness, 2012). In Australia with a population of 23 million people, it has been estimated that that 16% of the population have hearing loss and that about 15,400 deaf people in Australia use (Australian Sign Language) Auslan on a daily basis (Hyde & Power, 1998; Hyde & Power, 2003). And in the Netherlands, there are approximately 17 million in the general

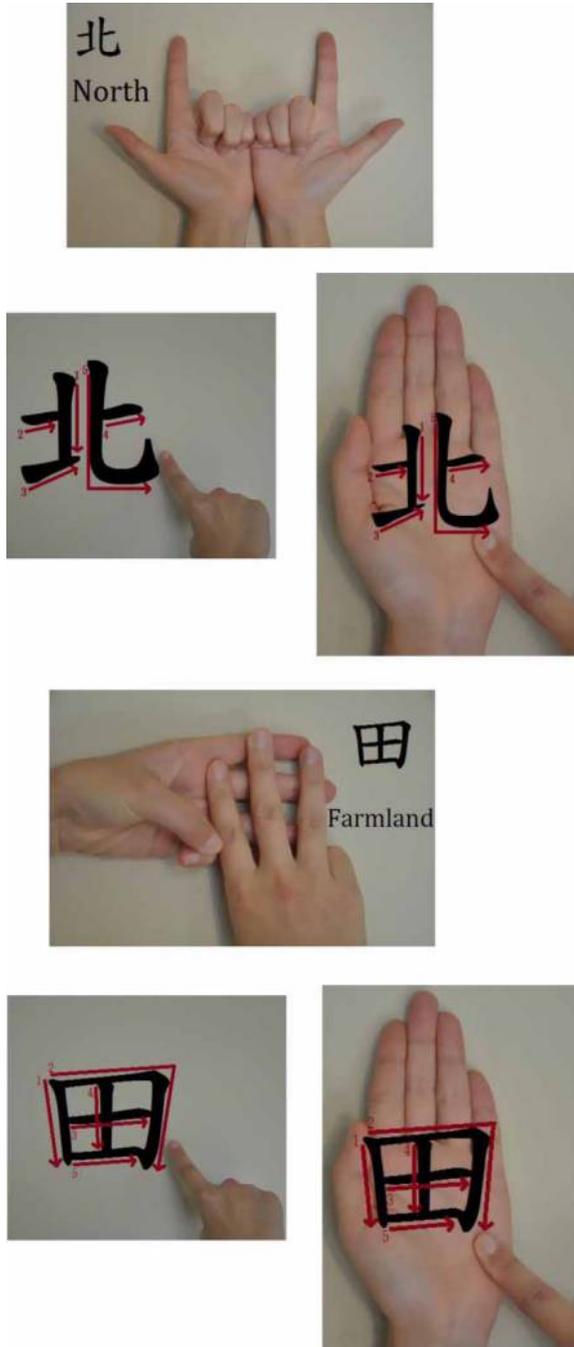


FIGURE 3 TSL character signs in frozen form, air writing, and palm writing.

For most of words, we can use the Zhuyin finger alphabet to demonstrate a word simultaneously using left and right hands together.

If the rime of the word is only one vowel, we can demonstrate a word simultaneously using left and right hands together. For example the word 貓 (cat), it is demonstrated in

Zhuyin as 貓 (there are only two symbols, the up is onset, the down one is rime, there is no tone symbol in this word because it is the first tone), you can see the first pictures in the Zhuyin finger alphabet of figure 2,



However, if the rime has two vowels (not many), we need two step to demonstrate a word.

For example, in the word 跳 (jump), the Zhuyin symbol is 跳

(there is 4 symbols in this word, the top one is onset, the second and the third one are rime, and the other is the tone.)

So we must have two pictures to demonstrate this word.

See below.



FIGURE 4 A demonstration of Zhuyin finger alphabet With Chinese Words.

population with an estimated 15,000–20,000 deaf people who use the sign language of the Netherlands (Parks & Williams, 2011). While we have approximate statistics on how many deaf people in Taiwan, China, the U.S., the UK, Australia, and the Netherlands who are deaf and those who utilise sign language to communicate, we have little data on how DHH students in these countries use their sign language to understand their written languages, either alphabetic or logographic. We believe this information to be important because the majority of DHH children grow up to be signing members of their deaf and hearing cultures.

We do know that reading achievement levels worldwide are lower than those of hearing children because of the spoken and sign language delays brought on by congenital and early onset hearing loss. It has been documented that in the U.S., UK,

Australia, Taiwan, Singapore, China and South Korea, and the Netherlands, that deaf children are reading below their hearing age-mates even after 9 years or more of compulsory education (Liu, 2004; Wauters *et al.*, 2006; Wang *et al.*, 2010; Qi & Mitchell, 2011).

It is our view that to get a full picture of DHH children's literacy learning, we must not only understand the linguistic structure of the languages the deaf children are learning to read as Wang *et al.* (2010) recommend in one of the first papers on reading with DHH students in the US, China, and South Korea, but we must also take into consideration the DHH children's language-learning background variables. Indeed, reading and writing achievement level scores are meaningless unless they are described in the context of these language background variables (Andrews *et al.*, 2004, 2012; Andrews, 2012).

Background language-learning variables

Such factors as age of onset of deafness, aetiology, or cause of deafness, type and extent of hearing loss, parent hearing status, intelligence level, type and extent of early intervention, type of educational programming, use of auditory technology, presence of other disabilities, and Deaf culture—all must be considered when discussing literacy achievement levels (Andrews *et al.*, 2004). For instance, a DHH child who is born profoundly deaf in a family where his parents are deaf, and he or she is exposed to a sign language and written language from an early age will have a different reading achievement profile than a child born deaf in a hearing family with little communication at home or with an aetiology that is combined with visual impairment, or with cognitive or learning disabilities (Andrews *et al.*, 2004, 2012). Or if a DHH child is born hearing or hard of hearing and experiences a progressive hearing loss, his reading profile will differ from a congenitally DHH child. As such, these factors related to biology, home environment, and instructional environment contribute to the DHH child's literacy learning and achievement. Oftentimes, researchers pit communication methodology against methodology or reading intervention against reading invention and fail to adequately describe these background variables, and give inflated gains for their favoured methodology.

Another factor frequently ignored is deaf culture. We consider deaf culture to be closely related to literacy learning because most DHH adults in Taiwan will use Chinese literacy and TSL in their everyday life even through their achievement levels and the extent of their use of both languages will vary widely (Y. Ku, personal communication, 15 August 2012). The daily use of two languages indicates deaf persons are bilingual (Grosjean, 2008, 2010). Interestingly, many Taiwanese people do not typically consider their deaf citizens as having their own language, TSL (Huteson, 2003). Nor do they consider Taiwanese Deaf people to have their own unique culture as American deaf people do (Leigh, 2009). Instead, they consider deaf people to be physically handicapped rather than culturally and linguistically different. While they are not considered a cultural group, deaf people are treated as a collective group in that they are provided social welfare services and

access to education (Huteson, 2003). Studies have shown that deaf persons' self-identity is related to the attitudes of their hearing family members, friends, teachers, parental values, and their contact with members of the deaf community as well as their educational experiences (Huteson, 2003; Lin, 2004; Liu & Liu, 2012). Along with deaf culture, the type education programming is another factor that impacts DHH students' literacy learning.

Education programming

Taiwanese deaf education has its roots in Japan. In fact, the Japanese brought public education and deaf education to the island during their 50-year occupation (1895–1945) (Ann, 2003; Smith, 2005). Japan imported deaf educators who brought their own Japanese Sign Language (JSL), the written Japanese language, as well as their instructional methodologies (Huteson, 2003; Hodgson 1953 cited in Ann, 2003).

Two schools for the deaf were set up around 1917 with Japanese teachers of the deaf using JSL as the language of instruction with teachers from Tokyo using one dialect of JSL and teachers from Osaka using their regional JSL dialect (Huteson, 2003).

There exist no records on what reading instructional methods were used. For example, it is not known whether Taiwanese DHH children were taught Japanese kanji (Chinese logographs) or kana (phonetic symbols for syllables) or both. Our informant, Yushan Ku, a deaf leader in Taiwan interviewed two Taiwanese deaf adults who were educated in deaf schools in the 1930s during the Japanese occupation. His deaf informants said they were taught Signed Japanese by their hearing teachers from Japan. Signed Japanese or Manually Signed Japanese is a signed form of the spoken Japanese that differs from the JSL used by deaf Japanese. In other words, it is a code that uses JSL lexical signs and places these signs into the grammar of Japanese spoken language (Smith, 2005).

At the deaf schools, according to Yushan Ku's informants, the hearing teachers of the deaf wore Japanese army uniforms. The deaf students learned JSL from their Japanese teachers who also taught them how to read and write Japanese. At that third grade, academics were stopped and the boys were taught carpentry, barbering, and shoe repair, and the girls were taught sewing and dressmaking. Ku also learned from his deaf informants that many of the deaf students upon learning these trades started their own shoemaking businesses when they reached adulthood with the support of their hearing families.

After World War II, the Taiwanese government brought in trained teachers of the deaf from China to work at schools for the deaf in these four cities: Tainan, Taichung, Hsinchu, and Kaohsiung (Huteson, 2003). It is interesting to note that some of these teachers were deaf, thus Taiwanese DHH children had deaf adult Chinese language and cultural models who modeled Chinese Sign Language (CSL) to them (Huteson, 2003).

After the Communist takeover in mainland China, the rebels moved to Taiwan and set up the Republic of China (ROC). This new government took over the

schools. There is little information on the reading teaching methodologies of these early schools in Taiwan. But it is assumed that when deaf teachers began to work in the schools the language of instruction was sign language, either a dialect of JSL or CSL or a blending of the sign languages with the sign languages used by Taiwanese deaf people who grew up on the island called TSL (Smith, 2005).

Ann (2003) describes the establishment of a unique school for the deaf in Kaohsiung, Taiwan called the Chiyung School. It was founded in the 1970s by Chiang Ssu Nung, a postlingually deaf man from mainland China. The language of instruction at his school was CSL even though other schools for the deaf on the island used TSL. Upon graduation, the school would hire its deaf graduates as teachers and bakers (Ann, 2003). Many of the students would first learn CSL then transfer to other deaf schools on the island where they would learn TSL (Ann, 2003). Smith (personal communication, 4 May 2012) points out that there is not one standardised CSL but there are a variety of regional variations. If a Deaf person was from Shanghai, his sign language would have regional differences from a Deaf person from Beijing. Shanghai signs show influences from British Sign Language, which was originally introduced to Shanghai by the founder of the first deaf school, John Fryer (Ann, 2003).

Languages, communication modes, and pedagogical tools

In contemporary Taiwan, we learned from the teachers that deaf students learn three languages. First, they are taught spoken and written Chinese by their families and at school. Second, they are taught English as it is introduced in the elementary school in both deaf and hearing schools in Taiwan. The third language that DHH children learn is TSL. If the child is in a class with a deaf teacher, they will learn TSL as early as in the elementary grades. In other classes, TSL may be not introduced until junior high or high school. Many DHH students will learn TSL on the playground with their deaf peers or from deaf adults in the community.

While there are no precise data, from interviews with the adult deaf community, many deaf adults will choose TSL as their primary or dominant language in adulthood because of its visual accessibility. They typically will use Chinese written language as their second language (Y. Ku, personal communication, 15 August 2012).

The learning of a sign language and the learning to read the Chinese characters for deaf children involve a series of visual recognition and memory tasks (Jones, 2013; Gaines & Yongzin, 1983). Sign language researchers have been interested in the reading of Chinese because both sign language and reading Chinese characters entail visual encoding (Bellugi *et al.*, 1989). It has been suggested that deaf Chinese children may have an easier time learning to read because of the visual coding based on morphemically based Chinese writing than American deaf children have in learning to read English, an alphabetic language based on phonemes (Jones,

2013; Gaines & Yongzin, 1983). More empirical research is needed to substantiate this claim.

Reading research conducted in China by Jones (2013) suggest that Deaf teachers who use sign language as the language of instruction and bridging practices from sign to Chinese print provide literacy instruction that not only expands children's thinking, but increases their metalinguistic awareness and specifically points out the Chinese word morphology and orthographic awareness for deaf Chinese children.

Features of Chinese Written Language compared to English Written Language

Learning of the Chinese characters is a visual memory task for Taiwanese DHH children. Students must learn that the characters, the basic elements of the Chinese writing system map onto morphemes. In contrast, when they learn English letters, the basic elements of written English, they learn that graphemes or letters map onto phonemes. The English alphabet has twenty-six letters to represent forty-four phonemes and its letter–sound relationship is complex and inconsistent which makes it difficult for deaf and hearing children alike to learn.

In Chinese, the sound unit is called the tone syllable and the written unit is the logograph or Chinese character. There are only 1300 syllables in Spoken Mandarin compared to 8000 syllables in English but there are approximately 5000 morphemes in daily use in Mandarin Chinese (Shu et al., 2003).

Each Chinese syllable can be divided into three parts: the onset, the rime, and the tone (Shu et al., 2003). Children must learn twenty-two onsets and thirty-eight rimes, and four tone in Mandarin (Wang et al., 2003). The onset of a Mandarin Chinese syllable is always a single consonant. The final segment consists of mainly vowels in most of the syllables. There are only two consonants that appear at the end of a final in Mandarin. They are /n/ and /ng/ as in /man/ and /mang/(Wang et al., 2003).

The small number of syllables results in a large number of homophones (words that have the same pronunciation but have a different meaning such as hear, here) poses difficulties for DHH readers. Another structural feature of Chinese, the tone, is also difficult from DHH students. Because of the existence of tone in Chinese syllables, a change in the tone of a syllable leads to a change in its meaning.

DHH students learn the four tones in Mandarin Chinese. These are often labelled as 1: high, 2: rising, 3: falling and rising, 4: falling (Shu et al., 2003). Because it is very difficult to distinguish the tones, deaf children are typically taught four specific hand movements in to order to give them a visual representation of the auditory tones. Whether this kind of learning of using a visual/gestural representation of tones is similar to hearing children learning the auditory tones has not been empirically tested.

Speech reading or lipreading is very difficult for Chinese-learning DHH children not only because of the distinction of tones but also because of the onsets and finals. The onsets share the same mouth shape (movements) and the vowels are formed in the mouth. Take, for example, the words, 爸/ba 4/(father), 媽/ma 1/(mother), 爬/pa 2/(climb).¹ These words have different onset consonants and tones but their mouth movements all are the same, which may confuse the Chinese DHH reader.

To supplement speechreading or lipreading, a visual handshape cueing system called Cued Speech was developed for American deaf children by Orin Cornett (1967). Cued Speech is a sound-based system composed of eight handshapes that represent the groups of consonants, which are placed in four positions around the face that indicate groups of vowel sounds. Proponents of Cued Speech claim it makes spoken language visible to the deaf child (Cornett, 1967). Smith (personal communication, 4 May 2012) worked with Dr Cornett in the 1970s to develop Cued Speech for Mandarin. There has been little research that has linked DHH students' use of Cued Speech in the development of reading Chinese.

The majority of Chinese characters (80–90%) are semantic–phonetic compound characters that consist of two major components (Shu *et al.*, 2003). One is a semantic component (often called a semantic radical) that gives information about the meaning of the character. The other is a phonetic component (often called the phonetic radical) that gives information about the character's pronunciation. Chinese reader can get the meaning cues from the radical. For example, the characters 喝, 吃, 吻, 咬 are all semantic–phonetic compound characters. They share the same radical 口 (mouth), so the meanings of these characters all are related with mouth. 喝 means drink, 吃 means eat, and 吻 means kiss. Besides semantic–phonetic compound characters, the other characters include pictograph, ideographs, and semantic compounds. These kinds of characters all offer the semantic cues, too which can assist the DHH children in reading and writing.

Pictographs, ideographs, and semantic compounds represent only a small percentage of present day characters (Taylor & Taylor, 1995). Pictographs are simple characters that were easily seen as picturing objects in Ancient Chinese. For example, 山 was the character for mountain. However, over centuries of use, pictographs have become more stylised so that today few of them clearly represent the objects they denote. The other type of meaningful simple character is the ideograph. Examples of ideographs include the characters for up 上 and down 下. Modern Chinese also contains some semantic compound characters in which the character meaning is suggested by the combination of the meanings of its components. For example, the character 明 (clear, bright) consists of the radical 日 for sun and the radical 月 for moon (Taylor & Taylor, 1995). DHH children may find these pictographs and ideographs easier to learn because of their visual transparency much like iconic signs are easier to learn. Future research needs to address this issue.

¹Ba 4 means the ba sound with the fourth tone, ba 1 means the sound with first tone, and ba 2 means the ba sound with the second tone.

Developmental language research by Wang et al. (2008) has shown by the second grade, Chinese hearing children know about 1200 characters. By grade 4, they know about 2600 characters. By grade 6, they know about 3300 characters. By high school they can read and write more than 3700 Chinese characters (Wang et al., 2008). However, currently, there exist no developmental data about how many characters DHH students in Taiwan. However, from interviews with teachers, deaf children's knowledge of characters is considerably less than their hearing age peers.

Features of English Written Language

According to our interviews with teachers, the DHH students are taught how to map Chinese characters and words they know onto English words, phrases, and sentences principally through memorisation. As they progress in the grades, the teachers reported that the amount of English written instruction increased.

Even though English is an alphabetic language where the letters, letter patterns or graphemes correspond to sounds or phonemes, Taiwanese DHH children are not taught to speak English or to read English using the alphabetic principle or the phonics approach. We found this intriguing because teachers do use the written phonetic script of Zhuyin Fuhao to teach Taiwanese DHH children how to speak and to read Chinese. Children begin by learning how to articulate the sounds of Chinese and also they practice making the strokes of characters early in preschool using these symbols so speaking, reading, and writing of Chinese words were introduced together as early as age five.

Features of Taiwan Sign Language

TSL is the third language that Taiwanese DHH children are exposed to at school. But later in adulthood, TSL because most deaf adults dominant and preferred language (Y. Ku, personal communication, 15 August 2012). TSL is part of the JSL family and has a distinct history from the history of the formation of CSL (Smith, 2005). TSL is not learned until the deaf student meets a deaf adult or a deaf peer either at school or in the community. It is acquired fairly rapidly because of its visual accessibility, use of signs, facial expressions, and body language (Smith, 2005). It is estimated that TSL is used by approximately 30,000 deaf persons in Taiwan (Smith, 2005).

TSL not only differs in structure than the spoken languages on the island such as Mandarin, it also differs from Southern Min (Taiwanese) and Hakka, spoken languages on the island as well as it differs from any other spoken language (Smith, 2005). Indeed, linguistic research as shown that TSL has more similarities to JSL and Korean Sign Language (Zeshan, 2004) and it has also borrowed some of its lexicon from the sign languages of mainland China and Hong Kong (Smith, 2005). It also has in its lexical signs that have been invented for educational purposes (for a review of these studies, see Smith, 2005). TSL has no fingerspelling system like American Sign Language (ASL). TSL and JSL share about 60 per cent of their

vocabulary. There is little research on the existence of TSL before the Japanese came to Taiwan in 1915 (Smith, 2005).

When in 1946, Mandarin Chinese was declared the major language for government and education in Taiwan (Sandel, 2003) and the Japanese teachers of the deaf returned to Japan. However, both schools for the deaf in Taiwan had at least one Taiwanese teacher who taught at the school during the Japanese occupation and who continued to teach in Taiwan under the new administration (Smith, 2005), the official language taught in schools for the deaf was Mandarin Chinese. When deaf teachers from China came to Taiwan to teach, they introduced Chinese signs to the school, pinyin, and also the pinyin finger alphabet (Smith, 2005). Pinyin is a written phonetic script for Chinese written language that uses a modified Roman alphabet. It is used in the People's Republic of China (Taylor, 2002). The pinyin finger alphabet is a fingerspelling system that matches handshapes with the pinyin written phonetic script.

Further, new signs were invented when the deaf children were instructed in Mandarin Chinese. As Smith (2005: 189) writes, 'Thirty years of separation have now resulted in numerous differences between TSL, JSL, and CSL, but the basic relationship still holds'.

Ku Yushan, the president of the National Association of the Deaf for Taiwan, called for the recognition of the 'natural sign language' (TSL) as the national language of the Deaf population similar to other minority languages of Taiwan being recognised (e.g. Hakka). Ku expressed opposition to findings of committees who have compiled sign language dictionaries and publications without including deaf people as contributors (Smith, 2005). Ironically, while TSL is included in the government's educational curriculum, it is not widely used by teachers who are predominantly hearing in schools for the deaf and mainstream classrooms with deaf children.

Communication modes

Signed Chinese

According to our teacher and administrator interviews, in elementary school when the information load increases and students are not successful with the oral method, teachers will introduce a communication mode called Signed Chinese or 'grammatical signs'. Signed Chinese differs from TSL, Chinese or English. Signed Chinese also uses the two modalities, the speech/auditory modality and the visual/gestural modality—both at the same time. In this case, it results in the mixing of TSL lexical signs and Chinese grammar.

Educators refer to this mixing as the Total communication approach (Andrews *et al.*, 2004). Depending on the needs of the child, the Total Communication approach in the U.S. may also include the use of ASL as well as the use of manual codes of English including speech, lipreading, Cued Speech, mime, gestures, drama, fingerspelling, writing, and reading—whatever the child needs to comprehend. When an English sign code is used with speech, it is called Simultaneous

communication approach. Johnson et al. (1989) refer to this as ‘sign supported speech’ and is not considered to be a language *per se* but a code. Other researchers refer to the bimodal or the bimodal/bilingual child who uses both visual and auditory information to process language (Morere & Allen, 2012; Nussbaum, Scott & Simms, 2012).

Pedagogical tools

Zhuyin Fuhao phonetic system

In China, teachers use pinyin, a phonetic system that allows the students to ‘sound-out’ Chinese words in order to teach young children how to read, in Taiwan, teachers use a system called Zhuyin Fuhao, what Taylor (2002: 42) terms, ‘a system loosely based on Chinese character components used in Taiwan, that represents onsets and rimes’. This is a phonetic (sound-based) system illustrated with written symbols. Zhuyin Fuhao consists of 37 characters and four tone marks. Here is an example of the word, 馬 horse written in Chinese characters with its associated Zhuyin Fuhao symbols that provide the phonetic equivalent of the Chinese word. Notice that word, horse is illustrated with only one Chinese character 馬 (馬 is Chinese character and the symbols above it ^{ㄇㄚˊ} are the Zhuyin symbols).

Zhuyin Fuhao remains the predominant phonetic system in teaching reading and writing in elementary school in Taiwan. It is also one of the most popular ways to enter Chinese characters into computers and to look up characters in a dictionary in Taiwan. In elementary school, particularly in lower years, Chinese characters in textbooks are often annotated with Zhuyin Fuhao symbols along side of unfamiliar characters as an aid to learning.

Zhuyin finger alphabet

Educators have taken the written visual symbols of Zhuyin Fuhao and paired them with a finger alphabet system, called the Zhuyin finger alphabet. The goal of the Zhuyin finger alphabet is to provide a visual-gestural aid or manual handshape cue that will assist deaf children in how to pronounce, read, and write Chinese words (see Figures 1 and 4).

The Zhuyin finger alphabet contains twenty-one handshapes on one hand to represent the twenty-one onsets and sixteen handshapes on the other hand to represent the sixteen vowels and four different hand movements on the vowels hand to represent the four tones.

Recall that each Chinese syllable is made up of three parts: the onset, the rime, and the tone. In the Zhuyin finger alphabet, the left hand has a handshape that represents the onset. The right hand has a handshape that represents the rime. The right hand will move to represent one of the four tones.

Deaf students in elementary school are taught to combine or chain Zhuyin Fuhao written symbols with the Zhuyin finger alphabet and this is then related to the

corresponding meaning, a Chinese word expressed in one or more characters (see Figure 4).

TSL character signs, air writing, and palm writing

Other tools that the teachers described were TSL characters signs, including air writing (konghu) and palm writing (shangshu) (Ann, 1998) (see Figure 3). A character sign is the use of the fingers and the hand to make a sign that looks like a Chinese written character by presenting it in it still (frozen form) or tracing it in the air using handshapes and movement or tracing or drawing the Chinese written character on the palm of the hand. Ann (1998) summarises the work of Smith and Ting (1979, cited in Ann, 1998: 70). She reports that there are estimated thirty to forty character signs in TSL. There are one-handed and two-handed character signs. Ann claims that character signs are composed of TSL handshapes that correspond to the written Chinese characters but that they take on their own linguistic significance apart from Chinese when they are used in TSL (see Figure 3).

Language policy, programs, and inclusion

Language policy

While there was no official language planning or language policy that is dictated to teachers and administrators for educators of deaf children, we learned from administrators that Mandarin Chinese is valued over the dialects of Taiwan as well as valued over the language of signs (TSL). However, the administrators informed us that each school will decide what communication methodology was best. In general, all of the administrators and the majority of teachers are hearing. From our interviews, we found that teachers believed that deaf children should be given ample opportunities to develop spoken language first. But when they fail and given the situation of the difficulties of deaf children learning to speak, then Signed Chinese should be introduced. Teachers and administrators have also been influenced by scholars in Taiwan who have advocated for oralism or who have advocated for Total Communication and this has impacted language planning and policy in the schools as well (Huteson, 2003).

Programs

According to the Special Education Transmit Net, there is a total of 3628 DHH students by the year 2011. Of these students, 567 of them are enrolled in classrooms which use the Total Communication or simultaneous communication method. In other words, the teachers use Signed Chinese with the children. These comprise a total of sixty-nine classes in three different deaf schools. On the island, 3409 deaf students receive instruction using the oral method (speech only, monolingual methods) within a total of ninety-five classes, resource rooms, regular schools, itinerant resource program, or consulting services. There were three designated schools of the deaf in three cities: Taipei, Taichung, and Tainan. In these deaf schools, the oral method is used in preschool and kindergarten and Total Communication

TABLE 1
DEAF AND HARD OF HEARING STUDENTS' PLACEMENT AND COMMUNICATION STATISTICS

	Ages	Consulting services	Itinerant resource program	Decentralised resource room	Centralised special education class	Deaf school	Day-care center for disability	Total
Kindergarten (N = 376)	0–6	Oral students: 110	Oral classes: 2, students: 160	0	Oral classes: 8, students: 25	Oral classes: 17, students: 75	Bilingual class: 1, students: 6	Oral 27 classes, 370 students Bilingual 1 class, 6 students
Elementary (N = 1367)	7–12	Oral students: 967	Oral classes: 21, students: 136	Oral class: 2, students: 13	Oral classes: 20, students: 106 Phonetic symbols classes: 3, students: 6	Total communication classes: 22, students: 145		Oral 43 classes, 1216 students TC 22 classes, 145 students Phonetic symbols 3 classes, 6 students
Middle (N = 889)	13–15	Oral students: 591	Oral classes: 6, students: 47	Oral classes: 7, students: 54	Oral classes: 12, students: 65	Total communication classes: 18, students: 132		Oral 25 classes, 757 students TC 18 classes, 132 students
High school (N = 996)	16–18	Oral students: 706	0	0	0	Total communication classes: 29, students: 290		Oral 706 students TC 29 classes, 290 students

using Signed Chinese and speech is used in the elementary and junior high and high school. In some deaf schools, if the teacher is deaf then TSL will be used. There are approximately eighteen deaf teachers and seven deaf teacher-aids in Taiwan. The deaf teachers have university degrees in various majors and have passed an examination to receive their license to teach (see Table 1).

Inclusion

In the 1980s, Taiwanese deaf education experienced a mainstreaming movement where deaf children were removed from schools for the deaf and they began attending classrooms in the public school. This same movement occurred in the U.S. brought on by Public Law 94-192 (now IDEA) in the US (see reviews in Andrews

et al., 2004). In the UK, a similar legislation called the Equality Act 2010 prohibits discrimination in education and supports inclusive education. While Australia does not have a Bill of Rights for its citizens from which IDEA legislation is drawn, they have the Commonwealth Disability Discrimination Act of 1992 which protects students with disabilities and their families by ensuring that appropriate services are provided (Keeffee-Martin, 2001).

The disability rights movement has developed in Taiwan since the 1980s, although the focus was on cognitively challenged children and adults (Chang, 2007). Prior to this social movement, disabled citizens were considered 'useless' or having a medical condition and not being capable of being educated or working (Chang, 2007). However, this social movement emerged to promote social change for disabled citizens and disability legislation was passed in the 1990s (Chang, 2007).

In Taiwan, Changhua was the first city to provide classes for deaf children in the regular schools in 1980. Then Taipei set the resource room for the DHH students. Other regular schools followed to accept more deaf children.

During the mainstreaming trend in Taiwan in the 1980s, there were efforts to ban sign language in the schools (Huteson, 2003). Teachers in preschools and kindergartens were required to use oral methods or the teaching of speech-only to the children. This monolingual approach to teaching very young deaf children in Taiwan still exists today (Huteson, 2003). However, in our class visitations we observed the frequently the teachers would use speech and Sign Chinese when teaching even in the early elementary grades. In fact, in our readings, we found that as early as the 1980s, Taiwanese schools with deaf students began to allow Total Communication and Simultaneous Communication (Hsing & Lowenbraun, 1997; Huteson, 2003) (for examples, see Figure 2).

We observed that on the playground that the children used a blend of Signed Chinese and TSL or contact signing. After learning TSL from deaf peers and deaf adults, deaf children often teach their hearing teachers, parents, and siblings TSL (Huteson, 2003) similar to the case in the U.S. where deaf children become the sign language teachers with their hearing family members in the home (Andrews *et al.*, 2013).

There are also a few experimental bilingual programs in Taiwan that introduce TSL early and teach Chinese as a second language. These programs are typically involved with studies at universities (Hsing & Ku, 2009).

There are also experiments to develop TSL/Chinese bilingual materials methods for teaching reading to young deaf children. Huang (2005) developed TSL/Chinese bilingual picture e-books for a bilingual (TSL/Chinese) kindergarten located in Kaohsiung. After one-and-a-half-year picture books reading intervention, they found the children liked to read more and more; their signed word comprehension was better than their comprehension of spoken words, and their post test scores on emergent reading scale were better than the scores of the pretest (Huang, 2005).

Liu (2006) utilised aspects of Marie Clay's Reading Recovery program to increase Chinese word recognition, vocabulary, and reading comprehension. Four deaf children ages 7–12 years participated. They were enrolled in elementary classrooms at

the Taichung school for the deaf. The teachers were trained in Reading Recovery methods related to shared book reading (Clay, 1979). The teachers signed the story-books written in Chinese by translating them into TSL and Signed Chinese. After 7 weeks of the intervention, the four DHH children's performance on character recognition, word recognition, and comprehension increased.

Summary and conclusion

In this first part of our paper, we underscored that more research is needed to understand how DHH children in Taiwan use their sign language to support their learning of Chinese literacy. Then, we examined contextual issues we believe surround the reading process such as island demographics, reading achievement levels, and background language learning variables including deaf culture. We then describe the linguistic features of the written languages that DHH children are learning (Chinese and English) as well as the sign codes (Signed Chinese, Zhuyin finger alphabet, character signs, palm writing, and air writing) and the Zhuyin Fuhao written visual symbols. Using this contextual information as a foundation, in Part II, we describe current classroom practices and recommend future directions for research.

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Appendix

1. What is your job position at school?
2. How do you improve your students' literacy?
3. What strategies do you recommend for the other teachers of the deaf in the teaching of reading and writing?
4. Do you use Sign Language? Signed Chinese? Zhuyin Fuhao phonetic systems? Zhuyin finger alphabet? Chinese Character signs? If yes, describe how you use them.
5. What is your teaching process during teaching of Chinese reading and writing in class?
6. What materials do you use in the teaching Chinese literacy?

7. What are your beliefs about teaching literacy to deaf children?
8. How do you use technology in the reading class?

Notes on contributor

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