



# An Integrated Approach to the Teaching and Learning of *zh*

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## Abstract

This paper presents an integrated approach to the teaching and learning of Chinese *zh*, one difficult sound particularly challenging to Hispanic students. The proposed approach consists of three components, namely a mouthercise, a flash animation, and a set of class practice and performance drills. An experiment of this approach has been conducted in a beginning Chinese class in an American university classroom setting. The results yield strong support for the efficacy of the proposed approach.

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## 1 Introduction

The teaching of the Chinese sound *zh* has always been considered one of the most formidable problems to overcome. Instructors are often frustrated by the lack of effective and efficient methods, the pressure of inadequate time, and the long-standing tradition that pronunciation is treated as an orphan or a luxury add-on in foreign language programs (Morley, 1987). Pronunciation of *zh* is also considered to be one of the notorious problems that Hispanic learners of Chinese have to face. This sound is particularly challenging to Spanish-English bilinguals mainly due to the fact that there is no counterpart in either Spanish or English. Even at the advanced level, many Hispanic learners of Chinese still cannot pronounce it correctly. In fact, its mispronunciation is one of the most evident signs that a person is not a native speaker of Chinese. As an attempt to address this practical challenge to both instructors and learners, the present paper presents an integrated approach to the teaching and learning of Chinese *zh*.

## 2 Context of Study

### 2.1 *Neglect of pronunciation in teaching and research*

There is a noticeable irony in the field of foreign language teaching and research. While no one denies that pronunciation is an important integral part of language and language learning, it is often treated as the “Cinderella” of foreign language teaching (Kelly, 1969), sidelined and marginalized. This neglect can be reflected and mirrored in the academic journals. Deng et al. (2009) examined the publication of fourteen prestigious applied linguistics journals during the 10-year period of 1999–2008. To calculate the percentage of articles devoted to pronunciation-related topics, they counted the total number of articles in each journal and the number of pronunciation-related articles. They found that none of these journals gave an adequate emphasis on pronunciation. The publication of pronunciation-related topics in these journals ranged from 0.54% to 7.38% as shown in Table 1.

Journal	Percentage
Language Testing	0.54
Modern Language Journal	0.81
Journal of Multilingual and Multicultural Dev.	1.17
TESL Canada	1.32
Language Learning	2.63
Canadian Modern Language Review	2.82
Applied Linguistics	2.91
ELT Journal	2.95
Language Awareness	3.29
Studies in Second Language Acquisition	4.35
System	4.89
Applied Language Learning	5.08
TESOL Quarterly	7.14
Prospect	7.38

**Table 1: Percentage of pronunciation articles over 10 years (1999-2008; adapted from Deng et al., 2009, p. 2)**

To make a comparison, a survey was conducted to find out the number of articles devoted to pronunciation-related topics in 《语言教学与研究》 (Journal of Language Teaching and Research), one of the most prestigious journals in Chinese language teaching and research in the People’s Republic of China. The survey was based on “A General Index to the Journal of Language Teaching and Research: 1979-2009” compiled and edited by the journal’s Editorial Board (2009) while 1979 was the inaugural year of the journal. This index classifies all the articles into 15 topic categories as shown in the following table.

As shown in Table 2, 2042 articles have been published in this journal over the span of 30 years. Under the topic category of Chinese Language Research, 54 articles are related to Chinese phonetics, forming a percentage of 2.6. In contrast, 593 articles are focused on Chinese grammar, forming a percentage of 29.

A further analysis of all the articles under the topic category of Teaching Chinese as a Foreign Language shows that only 25 articles (0.1%) are related to pronunciation teaching. In contrast, 91 articles can be found to deal with vocabulary and grammar teaching.

The publication of 54 articles related to Chinese sound studies and 25 articles related to pronunciation teaching over a span of thirty years indicates that studies of sounds and pronunciation teaching have a long tradition in the field of Chinese language teaching and research. However, it

is also clear from the survey that it is much less emphasized compared with other aspects of Chinese language.

Topic Categories	Number of Articles Published	Percentage
1. General	16	.007
2. Teaching Chinese as a Foreign Language	422	20.667
3. Language Acquisition Research	98	4.779
4. Language Testing Research	45	2.203
5. Chinese Textbooks Research	49	2.399
6. Foreign Languages Teaching & Research	55	2.693
7. Contrastive Study of Chinese and Foreign Languages	83	4.065
8. Chinese Language Research		
8.1. Phonetic Study	54	2.644
8.2. Morphological Study	129	6.317
8.3. Studies on Grammar	593	29.04
8.4. Rhetorical Study	44	2.155
8.5. Studies on Dialects	15	.007
8.6. Studies on Chinese Characters	13	.006
9. Studies on Language Applications	87	4.260
10. Sociolinguistics	50	2.449
11. Studies on Language and Culture	43	2.106
12. Book Reviews	60	2.938
13. Appraisal of Linguists	22	1.077
14. Speeches and Commemorate Articles	52	2.547
15. Others	112	5.484
<b>Total</b>	<b>2,042</b>	<b>100</b>

**Table 2: Articles classified in a journal index**

The small amount of attention given to pronunciation might be due to the following factors. First of all, there exists in the field of foreign language teaching an ongoing and controversial argument that pronunciation is not teachable. Representatives of this view cast doubt on the importance of pronunciation in foreign language teaching. According to them, pronunciation practice in class has little, if any, effect on learners' pronunciation skills. Research carried out by Suter and Purcell (see Suter, 1976; Purcell & Suter, 1980) seems to provide strong support for this view.

To determine the factors that might predicate and facilitate accurate pronunciation, Suter and Purcell examined the following twenty variables believed to have a possible influence on pronunciation:

1. Age at which the speaker first experienced residence in the target language country
2. Age at which the speaker was first able to converse meaningfully in the target language
3. Number of years the speaker has lived in the target language country
4. Amount of conversation at home which is carried on in the target language with native speakers
5. Amount of conversation at work and at school which is carried on in the target language with native speakers
6. Residence with native speakers
7. Total amount of formal classroom training
8. Amount of intensive formal classroom training
9. Amount of formal classroom training dedicated specifically to the pronunciation
10. Amount of formal training carried out under teachers who were themselves native speakers
11. Speaker's native language
12. Number of languages the speaker is able to converse in
13. Sex

14. Economic motivation
15. Social prestige motivation
16. Integrative orientation
17. Cultural allegiance
18. Strength of the speaker's concern about his or her pronunciation
19. Innate aptitude for oral mimicry
20. Extroversion-introversion

What they found was that “the variables relating to classroom training demonstrated very little relationship to pronunciation accuracy” (Suter, 1976, p. 250). Instead, their findings indicated that the most important variables responsible for mastering pronunciation in a foreign language were, in order of importance, as follows:

1. Native language
2. Attitude toward pronunciation
3. Interaction with native speakers
4. Natural ability to imitate foreign sounds, stress and intonation patterns

An important conclusion they drew from their research was that pronunciation practice in class had little effect on the learner's pronunciation skills and “the attainment of accurate pronunciation in a second language is a matter substantially beyond the control of educators” (Purcell & Suter, 1980, p. 286). The implication of this conclusion is that teaching pronunciation in the classroom is actually a waste of time since learners can develop their pronunciation accuracy, even without formal training, so far as their mother tongue is close to the target language and the learners have a very positive attitude toward the accuracy of their pronunciation, interact with native speakers and, on top of that, have a strong innate aptitude for oral mimicry.

Secondly, pronunciation is often divorced from communication in pedagogical approaches. There is no doubt that the current prevailing model for foreign language teaching is still the Communicative Approach. For the past 30-odd years, communicative competence, the key foundation of the Communicative Approach, has been a catchphrase within the field of foreign language teaching. It has been the lofty goal appearing in language standards, curricula, syllabi, teaching materials, and assessment. It has become so popular that language teachers have to relate their teaching to the notion of communicative competence. Otherwise, they will be considered unprofessional, a sign that they lack adequate pedagogical training. Quite ironically, pronunciation has not been considered as an inseparable component of communicative competence, has been downplayed in the Communicative Approach and has suffered from serious neglect in the communicative classroom. In other words, it has been given little attention, if it is not completely ignored as observed by Trammell (1999) “in the teaching of FL pronunciation under the imperatives of the current ‘communicative’ and ‘acquisition’ approaches to language teaching ... instruction in pronunciation has been de-emphasized or remains at the level of minimal phonemic contrasts” (p. 315).

One of the main reasons why pronunciation has been ignored in the Communicative Approach, as Pennington and Richards (1986) noted, is that “pronunciation, traditionally viewed as a component of linguistic rather than communicative competence or as an aspect of accuracy rather than conversational fluency, has come to be regarded as of limited importance in a communicatively oriented curriculum” (p. 207).

Other important reasons to account for the neglect of pronunciation in the Communicative Approach, as summarized by Hammond (1995, p. 294), include the following:

1. The teaching of pronunciation appeals only to learning and not to acquisition, and is therefore of no value in a system that is attempting to get students to acquire language.
2. The constant reference to correct pronunciation or to the correction of student pronunciation errors will inhibit students from speaking by raising their affective filters.
3. Since most second language instruction involves learners who have passed the so-called ideal age for language acquisition, these methodologists believe that adult students have already lost much of their innate capacity to acquire a nativelike pronunciation in a second language.

Thirdly, teachers are often reluctant to teach pronunciation. The teaching of pronunciation in foreign language classes has not been as successful as other aspects of foreign language teaching. This is in part due to teachers' negative attitude and their reluctance to teach pronunciation. MacDonald (2002) surveyed teachers about their reluctance to teach pronunciation and listed the following reasons why they avoided teaching pronunciation:

- the absence of pronunciation in curricula
- a lack of suitable teaching and learning materials of a high quality
- an absence of a skills and assessment framework with which to map student ability and progress in this area

In addition, effective strategies or techniques for teaching foreign language pronunciation are still lacking. As a natural consequence, teachers often do not know what strategies are appropriate when they meet a specific problem. They might simply avoid pronunciation instruction or fail to offer any substantial help to students as observed by Dalton (1997):

We are comfortable teaching reading, writing, listening and to a degree, general oral skills, but when it comes to pronunciation we often lack the basic knowledge of articulatory phonetics (not difficult to acquire) to offer our students anything more than rudimentary (and often unhelpful) advice such as, "it sounds like this; uuuh." (para. 1)

To sum up, pronunciation does not appear to have a central and integrated position in foreign language teaching. It has been sidelined and treated as a least important language skill in foreign language programs.

## 2.2 A difficult sound *zh* for Hispanic students

Limited literature can be found to document the difficulties experienced by learners of Chinese with a mother-tongue of Spanish. To identify which Chinese consonants would be difficult for Hispanic students, a survey was designed and developed (see Appendix A). In the survey, participants were asked to list and rank five sounds they felt to be most difficult among the 21 Chinese initials they had learned (*b, p, m, f, d, t, n, l, g, k, h, j, q, x, z, c, s, zh, ch, sh,* and *r*). Participants were also asked to briefly describe and explain why they felt a particular sound was difficult.

A total of 18 students participated in the survey, among whom, ten were female and eight were male. They were all Spanish-English bilinguals, with ten participants stating that Spanish was their first language and two participants indicating that English was their first language. As shown in the response, the difficult sounds they listed included *j, q, x, z, c, s, zh, ch, sh,* and *r* while *zh* was the only sound unanimously chosen by all the participants as one of the most difficult Chinese sounds. Of the 18 participants, four ranked it as the most difficult initial to learn, seven ranked it as the second, one ranked it as the third, three ranked it as the fourth, and three ranked it as the fifth most difficult initial to learn.

They presented the following reasons why the *zh* sound was difficult to learn:

- It sounds like *j*, yet it is very different from *j*.
- It is hard to pronounce and remember this sound.
- It is difficult to make a distinction between *zh* and *z*.
- It is very confusing to differentiate *zh* from *ch* and *sh*.

It is not difficult to understand why *zh* is a particular challenging and difficult sound for Hispanic students. One of the main reasons is that this sound is not used in either Spanish or English. Moreover, Spanish-English bilinguals often have troubles to pronounce *z* sound since there is no corresponding *z* sound in Latin American Spanish, where *z* "is not a phoneme" (Walker, 2010, p. 132) and is pronounced identically with a short voiceless *s*. In fact, one feature of the Valley English, a variety of English used in the Rio Grande Valley of Texas (where our university is located), is the use of *s* for *z*. Many of our students will pronounce the word *lose* as [lus] instead of /luz/, the word *was* as [wəs] instead of /wəz/ and the word *cheese* as [tʃis] instead of /tʃiz/. It is interesting to

notice that using *s* for *zh* is a persistent error for Hispanic students who are learning Chinese at the beginning level.

If *z* is already a confusing sound for Hispanic students, *zh* will definitely present more challenges since they cannot turn to *z* if they cannot pronounce *zh*, a learning strategy used by many native speakers of English in learning Chinese *zh* sound. One of our students made it clear to us that he would use *z* to avoid the frustration and embarrassment of being unable to pronounce *zh* correctly. For him, *z* was a good temporary holding place for *zh*. In fact, using *z* for *zh* is one of the most noticeable errors.

### 3 Proposed approach

To argue that pronunciation, even the most difficult sounds, is teachable, we propose an integrated approach to the teaching and learning of *zh*. The proposed approach consists of three components, namely a mouthercise, a flash animation, and a set of class practice and performance drills.

#### 3.1 Mouthercise

A mouthercise (see Appendix B) has been designed as muscle warm-up activities for *zh*. Our rationale for the design of this exercise was based on the following linguistic and physiological facts elaborated by Bei (2009) and Liu (2007):

- Warming up face muscles (including levator labii superioris nasi, zygomaticus minor, zygomaticus major, orbicularis oris, risorius, and velar) helps to reduce the inertia when preparing for speaking Chinese.
- Zygomaticus major and minor, as well as velar, need to be strengthened to enhance muscle efficiency associated with mouth-opening movement (especially opening wide from top to bottom) when speaking Chinese.
- The central section of orbicularis oris, the muscle around the mouth, is not used as often by non-native Chinese speakers.
- Tongue rolling is a basic skill in speaking Chinese. Fast tongue rolling ability supports clear and strong Chinese pronunciation.
- Tongue rolling is performed in a different axis in Chinese than in English. Chinese uses vertical axis tongue rolling rather than horizontal axis rolling.

#### 3.2 Flash animation

As part of this integrated approach, animated articulatory diagrams for Chinese sounds have been developed and made available to students on a specially designed website and the university's online Blackboard. This flash animation is an on-going project. The goal of this project is to present animated articulatory diagrams for every vowel and consonant used in Chinese. At present, we have only completed the diagrams for *zh*, *ch* and *sh*. The format of these diagrams is modeled on the University of Iowa site for the phonetic sounds of English, Spanish, and German (see <http://www.uiowa.edu/~acadtech/phonetics/>).

As shown in Figure 1, students can choose among these three target sounds. They can then listen to the sounds to be pronounced by the Chinese instructor or see the interactive diagrams of the articulatory anatomy while these sounds are produced. In addition, they can hear how these sounds are used in sample words.

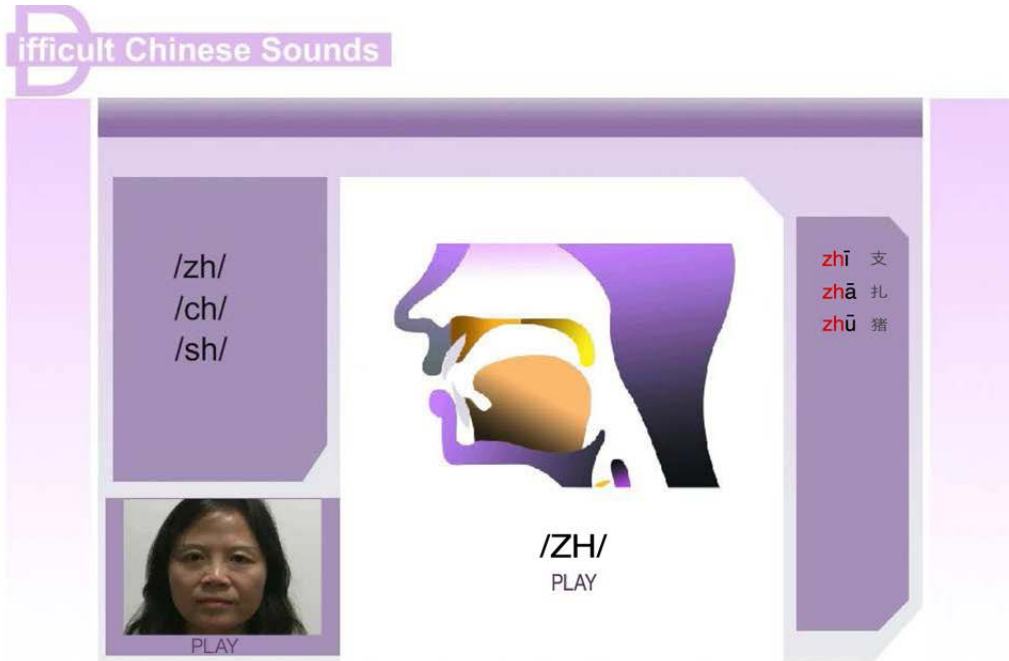


Fig. 1: Flash animation for zh

### 3.3 Class practice and performance drills

A set of class practice and performance drills has been created following the principles of individual sounds, sound sequences, sound discrimination, sound in words, and sound in context and in dialogue. Apart from commonly used drill types, this set of drills also takes the following forms:

#### *Nursery rhyme*

Zhīliao chàngē zhī zhī zhī;  
Máomao ài hē píngguǒzhī;  
Zhúzi zhǎngde cháng yòu zhí;  
Yǔzhòu yuánlái zhème dà.

#### *Song*

Zhǎo zhǎo zhǎo péngyǒu,  
Zhǎo dào yīge hǎo péngyǒu,  
Jīng-ge-lǐ, Wò-wò-shǒu,  
Nǐ shì wǒ de hǎo péngyǒu.

#### *Tongue twister*

Zhīdào jiù shuō zhīdào, bù zhīdào jiù shuō bù zhīdào. Bù yào zhīdào shuō bù zhīdào, bù zhīdào shuō zhīdào. Nǐ zhīdào bù zhīdào?

#### *Situational dialogue*

Zhēnzhēn:       Zhuāngzhuang, nǐ zhù nǎr?  
Zhuāngzhuang:  Wǒ zhù liúxuéshe sùshe. Zhēnzhēn, nǐ ne?  
Zhēnzhēn:       Wǒ yě zhù liúxuéshe sùshe. Zhuāngzhuang, nǐ zhù jǐhào lóu?  
Zhuāngzhuang:  Wǒ zhù liù hào lóu. Zhēnzhēn, nǐ ne?  
Zhēnzhēn:       Wǒ zhù bā hào lóu.

The proposed approach is called an integrated approach in the sense that it integrates a mouth-exercise, a flash animation, and a set of class practice and performance drills; it integrates the training of pronunciation, speaking and listening skills; it integrates oral, visual and kinetic coordination; and it integrates the drills of individual sounds, sound sequences, and sounds in discourse. As reflected in our 70-minute experimental course (see Appendix C), we designed and sequenced different activities as follows:

- Mouthercise (10 minutes)
- Flash animation (5 minutes)
- Sound contrast (5 minutes)
- Consonant-vowel combination (5 minutes)
- Nursery rhyme and tongue-twister (10 minutes)
- Sound discrimination (5 minutes)
- Dialogue practice (15 minutes)
- Song (15 minutes)

#### **4 Justification for the proposed approach**

##### **4.1 *There is no one perfect method suitable for all the learners***

There is no universal model or omnipotent teaching method. What works in one setting may not necessarily work in a different setting (Liu, 2007). Any model or teaching method has to be contextualized and localized in order to be efficient and effective. Furthermore, learning is an individualized process; thus no one teaching strategy is effective for all learners with varied personal differences (Coker, 2009). An integrated approach has the benefit to incorporate the insights and strength of different approaches and techniques.

##### **4.2 *Pronunciation is a kind of habitual muscle activity***

Hockett (1950), a well-known American linguist, defined pronunciation as follows:

*What is pronunciation?* When anyone speaks, in any language, he moves his lips, jaws, tongue, and certain other parts of the mouth, nose, throat, and diaphragm, in certain ways. These motions produce sound waves, which travel through the air to the ears of someone else; if that second person happens to know the same language, there follows (usually) the type of behavior which we call *understanding*. (p. 261)

For Hockett, the motions of lips, jaws, tongue, and other parts of the oral cavity for any one language are habitual, automatic and subconscious. The habits of pronunciation for different languages, however, are not the same. This is because “we simply do not have the necessary habits. We have to start by consciously guiding our tongue and lips, practicing until those organs are making the right motions” (Hockett, 1950, pp. 261–262).

Similar to pronunciation, speech is generally considered by speech pathologists as the end result of muscle movements (Rosenfeld-Johnson, 2001). Specifically, the awareness of the muscle, placement of the muscle, strength/muscle memory, and production are the critical elements of speech. In practice, speech pathologists use special activities to increase sensation, jaw stability and control, as well as jaw and tongue dissociation to facilitate sound and speech production (Bahr, 2001). Mouthercises are also routinely used as a daily preparation by TV anchors and radio announcers (Bei, 2009).

##### **4.3 *Visual images help pronunciation and speaking***

As suggested by Bandura (1969), there are two different modalities of observational modeling in learning: visual and auditory. The classification of visual and auditory modeling helps distin-



guish information conveyed from the demonstrator to the observer. O'Connor and Hermelin (1978) also make a good point that spatial information (relative positioning), temporal information (duration and sequence), and strategic information are the three aspects of information content that can be transferred through modeling. Information regarding the skill to be learned can be transferred efficiently when the models presented correspond with the sensory modalities receiving the information. O'Connor and Hermelin (1978) further propose that the nature of a motor task, whether spatial or temporal, needs to be matched with the modality of modeling (visual or auditory) in order to provide the most proficient transferring of information. In summary, a visual stimulus helps to focus the learner's attention on speech production as human beings visually scan and track our environment as a natural behavior.

#### ***4.4 Nursery rhymes, tongue-twisters and songs can provide a challenge and context, and promote interest and motivation***

It has been observed that nursery rhymes, tongue-twisters and songs are effective ways to improve pronunciation and should be incorporated into language classrooms, especially language classes for speaking and pronunciation since they can provide a challenge and context, and can promote interest and motivation (Bryant, Bradley, Maclean, & Crossland, 1989; Lord, 2008).

Nursery rhymes can capture students' enthusiasm and help students to get a taste of the cultural flavor of the country. They can also help students learn to articulate different sounds because repetition is frequently used within nursery rhymes.

Tongue-twisters can attract students' attention and interest by providing a challenge in making the distinction between similar sounds.

Songs can create a classroom atmosphere where students can relate to songs as part of entertainment rather than work and find learning sounds through songs amusing rather than tedious. Songs can also offer a window on the culture of the people who speak the language.

#### ***4.5 Technology can provide models, images and fun***

Language teaching and learning can be enhanced by effective use of technology, which can provide models, images and fun. In a way, technology can be at the heart of the learning and the teaching process since technology is at the forefront of everyday life in the world today. With the help of technology, greater availability, accessibility and flexibility can be accomplished; media and linguistic skills can be integrated; authentic materials can be constantly accessed; learner involvement and motivation can be increased; and learning can be made more enjoyable (Salaberry, 2001; Warschauer & Meskill, 2000).

### **5 Experiment**

To test the effectiveness of the proposed approach, an experiment was conducted in a beginning Chinese class at the University of Texas-Pan American, a major Hispanic-serving institution located in the Lower Rio Grande Valley of Texas close to the border of Mexico. 20 students participated in the experiment. Among those 20 participants, ten were female and ten were male. They were all bilingual speakers of English and Spanish.

A regular 70-minute class was used for the experiment. In fact, this was the fourth class on Chinese pronunciation. In the previous three classes, students had already learned tones, simple finals (a/o/e/i/u/ü), compound finals (ai/ei/ao/ou/ia/ie/iu/iao/ua/uo/ui/uai/üe), labial initials (b/p/m/f), alveolar initials (d/t/n/l), velar initials (g/k/h), palatal initials (j/q/x), dental sibilant initials (z/c/s), front nasal finals (an/en/in/ian/un/uan/üan/ün), back nasal finals (ang/eng/ing/ong/iang/iong/uang/ueng), and retroflex initials (r).

To test the efficacy of the proposed approach, a pre/post-test (see Appendix D) and a survey questionnaire (see Appendix E) were used to collect the data.

Two experienced instructors of Chinese went through a training session and served as raters. Reliability testing demonstrated a rate of interrater reliability of 90 percent. In cases where there was a difference in view between the two raters, a third instructor of Chinese, who also received the training, was consulted.

### 5.1 Pre-test and post-test

After permission was secured from the university's Institutional Review Board and the students, a pre-test and a post-test were administered to all participants. The tests were designed to collect data to answer the following three specific research questions:

1. How does the proposed approach affect the learning of the individual *zh* sound?
2. How does the proposed approach affect the learning of *zh* combined with different vowel sounds?
3. How does the proposed approach affect the learning of *zh* used in bisyllabic words?

The test consisted of 12 items. The first item (*zh*) was intended to collect data to answer the first research question, the next seven items (*zhā zhē zhū zhēn zhūn zhāng zhōng*) were for the second research question, and the last four items (*zhàn zhe zhēnzhòng zhēngzhào zhuózhuāng*) were for the third research question.

During both tests, all participants were asked to pronounce *pinyin* items presented to them one by one. Tested *pinyin* items for the pre-test and the post-test were identical. The sequence of the tested items during post-test was randomized in order to eliminate sequence familiarity. Participants' pronunciations of the tested items were recorded for evaluation purposes with participants' consent. The raters and the instructor of the class were not engaged in the data collection process. Randomizing all recordings for the raters insured a double-blind evaluation process. In addition, a scoring rubric was carefully designed and developed (see Appendix F).

Based on the scoring rubric, a grading form was developed to evaluate students' pronunciation of the 12 items. Specifically, pronunciation of the individual *zh* sound was evaluated using a scale from 0 to 1 (0, Poor; and 1, Excellent). Pronunciation of *zh* sound combined with different vowels was evaluated using a scale from 0 to 3 (0, Poor; 1, Fair; 2, Good; and 3, Excellent). Pronunciation of *zh* sound in two-syllable words was evaluated using a scale from 0 to 5 (0, Poor; 1, Fair; 2, OK; 3, Good; 4, Excellent; and 5, Superior). In addition, a dichotomous score was shown on the grading form for the rater's general perception of the student's command of the *zh* sound. An assigned score of 1 indicated the mastery of the sound while 2 indicated no mastery.

## 6 Findings

### 6.1 Test results

Out of 36 students, 20 successfully completed the training in the experiment class and took both tests, yielding a completion rate of 56%. Table 3 presents detailed average scores, accompanied by standard deviations for the pre- and post-tests.

As shown in Table 3, an increased score could be observed for each of the twelve tested items. Additionally, dichotomous perception scores of the raters on the participants' command of the *zh* sound came down from  $M = 1.75$ ,  $SD = .444$  to  $1.10$ ,  $SD = .308$ . This was an encouraging result because the raters perceived that the students averaged a much closer score for mastering the *zh* sound on the post-test than on the pre-test. The paired t-test showed that the raters' perception towards pronunciation of the participants demonstrated during the pre-test was significantly different from that during the post-test, yielding a  $t = 5.940$ ,  $p$  (two-tailed) = .000. Perceived improvements demonstrated by students' pronunciations were significant at .001 level.

Items	Pre-test		Post-test	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<i>Individual sound</i>				
1. zh	.90	.788	2.35	.671
<i>Combined with vowels</i>				
2. zhā	1.65	.933	2.55	.759
3. zhē	1.00	.918	2.35	.671
4. zhū	1.30	1.031	2.30	.865
5. zhēn	1.40	.94	2.45	.826
6. zhūn	.75	.786	2.00	.649
7. zhāng	1.40	1.095	2.50	.761
8. zhōng	1.65	.875	2.60	.681
<i>In bisyllabic words</i>				
9. zhànzhe	2.50	1.235	4.35	1.182
10. zhēnzhòng	2.80	1.473	4.10	.641
11. zhēngzhào	2.20	1.542	4.20	.616
12. zhuózhuāng	2.85	1.387	4.50	.827

**Table 3: Average scores and standard deviation**

12 individual paired t-tests were performed to identify any significant differences from the pre-test to the post-test. A Bonferroni adjustment made to the significance level (.05 divided by 12) was also performed to ensure the statistical accuracy as a required procedure. Results of all the following 12 tested items were significant at  $.0042 < .01$  level. Among those 12 tested items, seven were significant at  $.0008333 < .001$  level, yielding a robust evidence for the effectiveness of the proposed integrated approach in teaching the sound.

In Table 4, \* indicates that a significant difference was found at .0042 level, while \*\* indicates that a significant difference was found at .0008333 level.

Items	<i>t</i> ( <i>df</i> = 19)	Sig. (2-tailed) <i>p</i>
<i>Individual sound</i>		
1. zh	-6.175	.000**
<i>Combined with vowels</i>		
2. zhā	-3.596	.002*
3. zhē	-4.925	.000**
4. zhū	-3.979	.001*
5. zhēn	-5.688	.000**
6. zhūn	-5.225	.000**
7. zhāng	-4.067	.001*
8. zhōng	-3.866	.001*
<i>In bisyllabic words</i>		
9. zhànzhe	-6.135	.000**
10. zhēnzhòng	-3.812	.001*
11. zhēngzhào	-5.748	.000**
12. zhuózhuāng	-5.472	.000**

**Table 4: Paired t-test results**

## 6.2 Survey questionnaire results

Participants' positive response to Question 5 (How satisfied are you with the following activities in the experiment class of learning *zh* sound?) can be summarized in Table 5, where the numbers in the bracket represent the absolute frequency.

	<b>Most Satisfied</b>	<b>Generally Satisfied</b>	<b>Moderately Satisfied</b>	<b>Somewhat Satisfied</b>	<b>Least Satisfied</b>
<b>Mouthercise</b>	65% (13)	20% (4)	15% (3)	0% (0)	0% (0)
<b>Interactive Flash</b>	65% (13)	30% (6)	5% (1)	0% (0)	0% (0)
<b>Comparison/Contrasting Drill</b>	65% (13)	30% (6)	5% (1)	0% (0)	0% (0)
<b>Consonant-Vowel Combination</b>	60% (12)	35% (7)	5% (1)	0% (0)	0% (0)
<b>Nursery Rhyme</b>	80% (16)	10% (2)	10% (2)	0% (0)	0% (0)
<b>Tongue-twister</b>	85% (17)	10% (2)	5% (1)	0% (0)	0% (0)
<b>Song</b>	95% (19)	5% (1)	0% (0)	0% (0)	0% (0)
<b>Conversation</b>	50% (10)	45% (9)	5% (1)	0% (0)	0% (0)
<b>Total Average</b>	71%	23%	6%	0%	0%

**Table 5: Survey results**

Table 5 shows that the participants were overwhelmingly satisfied with the various activities used in the experiment class. If the results in the columns of *Most Satisfied* and *Generally Satisfied* are combined, *Song* occupies the highest percentage (100%), followed by *Interactive Flash* (95%), *Comparison/Contrasting Drill* (95%), *Consonant-Vowel Combination* (95%), *Tongue-twister* (95%), *Conversation* (95%), then by *Nursery Rhyme* (90%), and lastly, by *Mouthercise* (85%).

The participants also gave very positive comments on:

#### Song

- I really liked learning with songs. It is a great way to practice on my own. The songs are catchy so it is easier to memorize new words.
- I did like the songs in class. I think they do help learn Chinese. I feel the songs help you memorize Chinese pronunciation and tones.
- I believe music is an excellent tool to learn the Chinese language. I learned the ABC's with a song, so I think singing songs in Chinese will improve my skills tremendously!
- The song helped a lot in confidence, repetition and pronunciation.

#### Mouthercise

- I liked the mouthercise. It was very helpful.

#### Interactive Flash

- The interactive flash was great in its way of describing how to pronouncing *zh*, *ch* and *sh* sounds, which sound alike yet differ greatly when one knows the difference.

#### Tongue-Twister

- I really enjoyed tongue-twisters. They did make my tongue twist. They were cool and awesome.

#### The class as a whole

- This experiment class was interesting and got everyone involved. It was a good experience and I did like it.
- I enjoyed the class. The instructor was very helpful. She made us repeat what she was trying to get across. I found the mouthercise interesting and the Chinese songs interesting. Thanks for a great class.
- I really enjoyed all those activities. It was fun to learn Chinese.

## 7 Conclusions

This paper presents an integrated approach to the teaching and learning of the Chinese *zh* sound, a difficult sound particularly challenging Hispanic students. The proposed approach integrates a mouthercise, a flash animation, and a set of class practice and performance drills; it inte-

grates the training of pronunciation, speaking and listening skills; it integrates oral, visual and kinetic coordination; and it integrates the drills of individual sounds, sound sequences, and sounds in discourse.

An experiment of this approach has been conducted in a beginning Chinese class at the university classroom setting. The results from both the pre/post-test and the survey questionnaire on the one hand indicate clearly that pronunciation can be taught, and on the other hand yield strong support for the efficacy of the approach, which has the advantage of getting students motivated, challenged, engaged and interested in learning Chinese sounds. Even after the experiment class, many participants reported that they continued to use the mouthcise, to play around with the interactive flash, and to perfect their pronunciations of every difficult sound in tongue-twisters and songs. Moreover, they challenged themselves in learning more difficult and complicated tongue-twisters and songs in their spare time. In fact, only one month after the experiment class, some of the participants gave a very impressive performance of their newly-learned Chinese tongue-twisters and songs at a celebration party for the Chinese Spring Festival organized by the Association of Chinese Scholars and Students on campus.

Because of the exploratory nature of this study, there are some noteworthy limitations. One limitation of the present study is that it involves only a small number of participants. As a result, findings from this study have to be interpreted with caution. Further research with a larger population will extend the generality of these findings. Another limitation of this study is its focus on only one Chinese sound. Teaching and learning of those difficult Chinese sounds definitely merit extensive and intensive studies. A third limitation is that this proposed approach does not exhaust the possibility to integrate all the useful techniques and classroom activities. Further experiments can be designed and conducted to incorporate any other reported effective techniques and class activities. A fourth limitation is that there was no control group due to the limited same-level Chinese classes offered on the campus at the time when the experiment was conducted. Only the writers' past teaching experience was used to form the assumption that difficult sounds like *zh* could not be effectively taught and learned without a carefully designed approach to get students involved and motivated. In spite of these limitations, the present study does demonstrate that effective and efficient approaches can be exploited, designed and developed to tackle the difficult Chinese sounds, which, without any doubt, can be taught in class.

## References

- Bahr, D. (2001). *Oral motor assessment and treatment: Ages and stages*. Boston: Allyn and Bacon.
- Bandura, A. (1969). *Principles of behavior modification*. New York: Holt, Rinehart and Winston.
- Bei, F. [北方]. (2009). 播音主持日常基本功训练(口部操) [Announcer's daily practice of basic skills (Mouthcise)]. Retrieved from <http://www.bfgbw.cn/view.asp?id=23>
- Bryant, P., Bradley, L., Maclean, M., & Crossland, J. (1989). Nursery rhymes, phonological skills and reading. *Journal of Child Language*, 16, 407–428.
- Coker, C. (2009). *Motor learning and control for practitioners* (2<sup>nd</sup> ed.). Scottsdale, AZ: Holcomb Hathaway Publishers.
- Dalton, D. (1997). Some techniques for teaching pronunciation. *The Internet TESL Journal*, 3(1). Retrieved from <http://iteslj.org/Techniques/Dalton-Pronunciation.html>
- Deng, J., Holtby, A., Howden-Weaver, L., Nessim, L., Nicholas, B., Nickle, K., Pannekoek, C., Stephan, S., & Sun, M. (2009). *English pronunciation research: The neglected orphan of second language acquisition studies?* (PMC Working Paper WPO5-09). Edmonton: University of Alberta, Canada.
- Editorial Board. (2009). 语言教学与研究三十年总目录: 1979–2009 [A General Index to the Journal of Language Teaching and Research: 1979–2009]. *Journal of Language Teaching and Research*. Retrieved from [http://www.blcu.edu.cn/yys/3\\_mag\\_1/3\\_4\\_content.asp](http://www.blcu.edu.cn/yys/3_mag_1/3_4_content.asp)
- Hammond, R. (1995). Foreign accent and phonetic interference: The application of linguistic research to the teaching of second language pronunciation. In F. Eckman, D. Highland, P. Lee, J. Mileham & R. Weber (Eds.), *Second language acquisition theory and pedagogy* (pp. 293–303). Mahwah, NJ: Lawrence Erlbaum Associates.
- Hockett, C. (1950). Learning pronunciation. *The Modern Language Journal*, 34(4), 261–269.
- Kelly, L. (1969). *25 centuries of language teaching*. Rowley, MA: Newbury House.

- Liu, J. (Ed.). (2007). *English language teaching in China: New approaches, perspectives and standards*. London & New York: Continuum International.
- Lord, G. (2008). Podcasting communities and second language pronunciation. *Foreign Language Annals*, 41(2), 364–379.
- Macdonald, S. (2002). Pronunciation: Views and practices of reluctant teachers. *Prospect*, 17(3), 3–18.
- Morley, J. (Ed.). (1987). *Current perspectives on pronunciation: Practices anchored in theory*. Washington, DC: TESOL.
- O'Connor N., & Hermelin, B. (1978). *Seeing and hearing and space and time*. London: Academic Press.
- Pennington, M., & Richards, J. (1986). Pronunciation revisited. *TESOL Quarterly*, 20(2), 207–225.
- Purcell, E., & Suter, R. (1980). Predictors of pronunciation accuracy: A reexamination. *Language Learning*, 30(2), 271–287.
- Rosenfeld-Johnson, S. (2001). *Oral-motor exercise for speech clarity*. Tucson, AZ: Ravenhawk Books.
- Salaberry, M. (2001). The use of technology for second language learning and teaching: A retrospective. *The Modern Language Journal*, 85(1), 39–56.
- Suter, R. (1976). Predictors of pronunciation accuracy in second language learning. *Language Learning*, 26(2), 233–53.
- Trammell, R. (1999). English ambisyllabic consonants and half-closed syllables in language teaching. *Language Learning*, 49, 311–356.
- Walker, R. (2010). *Teaching the pronunciation of English as a lingua franca*. Oxford & New York: Oxford University Press.
- Warschauer, M., & Meskill, C. (2000). Technology and second language learning. In J. Rosenthal (Ed.), *Handbook of undergraduate second language education* (pp. 303–318). Mahwah, NJ: Lawrence Erlbaum.

## Appendix A: Student Survey Form

### About yourself (please check one)

Are you a bilingual? Yes \_\_\_\_\_ No \_\_\_\_\_  
 Gender: Female \_\_\_\_\_ Male \_\_\_\_\_  
 First language(s): Spanish \_\_\_\_\_ English \_\_\_\_\_ Both Spanish & English \_\_\_\_\_

### Survey question

Among the 21 Chinese initials (*b, p, m, f, d, t, n, l, g, k, h, j, q, x, z, c, s, zh, ch, sh*, and *r*) you have learned, please list and rank 5 sounds you feel most difficult (1 is considered as the most difficult sound; 2, the second most difficult sound; 3, the third most difficult sound; 4, the fourth most difficult sound; and 5, the fifth most difficult sound). Please also briefly describe and explain why you feel a particular sound difficult.

Rank	Sound	Why
1		
2		
3		
4		
5		

### Any other comments

## Appendix B: Mouthercise for *zh*

Specific muscle activities introduced below are used to prepare spoken Chinese practitioners (physically and mentally) for positive transfer in making the correct pronunciation of *zh*.

Take the following steps to complete a warm up. Each activity needs at least 8 counts; either hold the position for 8 counts or repeat a movement for 8 times. Go over the 8 counts if necessary.

- Rub both your hands until they feel hot and massage your own cheek.
  - Massage the cheek area using both hands at the same time, one hand on each cheek.
  - Massage the cheek area using both hands alternatively, one hand on each cheek.
- Open your mouth as much as possible from top to bottom (as if making a big yawn).
- Pucker your lips as tight as possible (as if a kiss is being made to the person you love the most).
- Grin as big as possible.

5. Run your tongue along the front surface of your teeth
  - a. Clock-wise
  - b. Counter clock-wise
6. Run your tongue along the back surface of your teeth
  - a. Clock-wise
  - b. Counter clock-wise

Practice the next 4 drills at 4 counts each

- 7.1. Stop your tongue in the middle of the back of your upper and lower teeth and remain at this position.
- 7.2. Roll your tongue up and touch the back of your upper teeth with the tip of your tongue.
- 7.3. Roll your tongue up and touch the palate (roof) of your mouth with the tip of your tongue.

8. Practice chaining the above 3 drills in one sequence with 8 counts. Spend 2 counts at each tongue position.

### Appendix C: Lesson Plan for zh

- 一、前测（15分钟）（课前进行）
- 二、热身运动,做口腔操（10分钟）
- 三、看口腔图,听发音,学习单个标准音（5分钟）
- 四、对比练音（5分钟）

zizi-----zhizhi（练习发音部位和舌头形状）

- 五、学习声韵组合音,放ppt（5分钟）

开口呼: zhā (扎) zhē (毡) zhī (枝) zhāi (摘) zhāo (招) zhōu (粥)

合口呼: zhū (猪) zhuā (抓) zhuō (桌) zhuài (拽) zhuī (追)

前鼻韵母: zhān (粘) zhēn (针) zhūn (准) zhuān (砖)

后鼻韵母: zhāng (章) zhēng (蒸) zhōng (钟) zhuāng (桩)

- 六、听儿歌学绕口令,熟悉语流中的zh（10分钟）

#### Pinyin

Zhīliao chànggē zhī zhī zhī; máomao ài hē píngguǒzhī; zhúzi zhǎngde cháng yòu zhí; yǔzhòu yuánlái zhème dà.

#### Chinese Character

知了唱歌, zh, zh, zh; 毛毛爱喝苹果汁; 竹子长得长又直; 宇宙原来这么大。

#### English

Cicada sings songs like zh zh zh; baby likes to drink apple juice; bamboo grows tall and straight; cosmos is in fact so big.

#### Pinyin

Zhīdào jiù shuō zhīdào, bù zhīdào jiù shuō bù zhīdào. Bù yào zhīdào shuō bù zhīdào, bù zhīdào shuō zhīdào. Nǐ zhīdào bù zhīdào?

#### Chinese Character

知道就说知道, 不知道就说不知道。不要知道说不知道, 不知道说知道。你知道不知道?

#### English

If you know, just say you know; and just say you don't know if you don't know. You shouldn't say you don't know when you know, and say you know when you don't know. You know?

- 七、做练习: 教师读, 学生辨别（5分钟）

- 1、分辨单个标准音

判断下列音是否是 zh:

b t h zh j r c s zh z

- 2、分辨声韵组合音:

判断下列音节是否带 zh:

- |          |      |       |      |
|----------|------|-------|------|
| A. zhā   | bāi  | pō    | mā   |
| B. pū    | dū   | zhuā  | shuō |
| C. gēn   | zhān | chēn  | dūn  |
| D. zhāng | zēng | chōng | rēng |
| E. hēi   | lōu  | zhuī  | rī   |





- zhāng
- zhōng
- zhànzhē
- zhēnzhòng
- zhēngzhào
- zhuózhūāng

Notes:

1. Tested *pinyin* items for the pre-test and the post-test should be identical.
2. The sequence of the tested items during post-test will be randomized in order to eliminate sequence familiarity.
3. Participants' pronunciations of the tested items should be recorded for evaluation purposes with participants' consent.

### Appendix E: Student Survey/Evaluation Form

Your comment and evaluation are important for the successful running of the Chinese language program. Please note that this survey evaluation is strictly confidential. It will not be reviewed by the instructor until it has been compiled into a report. Your sincere co-operation will be greatly appreciated.

1. Why do you take Chinese?
2. Are you planning to continue Chinese after this class?  
Yes.          No.  
Why?
4. How important are the following aspects of the Chinese language for your goals? (1=least important, 5=most important)
 

Speaking	1	2	3	4	5
Listening	1	2	3	4	5
Reading	1	2	3	4	5
Writing	1	2	3	4	5
5. How satisfied you are with the following activities in the experiment class of learning *zh* sound? (1=least satisfied, 5=most satisfied)
 

Mouthercise	1	2	3	4	5
Interactive Flash	1	2	3	4	5
Comparison/Contrasting Drill	1	2	3	4	5
Consonant-Vowel Combination	1	2	3	4	5
Nursery Rhyme	1	2	3	4	5
Tongue-twister	1	2	3	4	5
Song	1	2	3	4	5
Conversation	1	2	3	4	5
6. Anything in this experiment class you particularly like?
7. Anything in this experiment class you want to see the improvement?
8. Other comments.

### Appendix F: Scoring Rubric

**Core research question:**

- Does the proposed approach affect the learning of *zh*?

**Related research questions:**

1. How does the proposed approach affect the learning of the individual *zh* sound?
2. How does the proposed approach affect the learning of *zh* combined with different vowel sounds?
3. How does the proposed approach affect the learning of *zh* used in two-syllable words?

#### Scoring Rubric for Research Question 1

**Question:** How does the proposed approach affect the learning of the individual *zh* sound?

**Pre-Post test item:** zh

	<b>Accuracy</b>	<b>Elaboration</b>
<b>1 Excellent</b>	<i>zh</i> correct	Students are able to pronounce <i>zh</i> correctly.
<b>0 Poor</b>	Incorrect	Students are unable to pronounce <i>zh</i> correctly.

### Scoring Rubric for Research Question 2

**Question:** How does the proposed approach affect the learning of *zh* combined with different vowel sounds?

**Pre-Post test items:** zhā zhē zhū zhēn zhūn zhāng zhōng

	<b>Accuracy</b>	<b>Elaboration</b>
<b>3 Excellent</b>	Correct	Students are able to pronounce <i>zh</i> correctly as well the combined vowel sounds and tones.
<b>2 Good</b>	<i>zh</i> correct, but vowel and/or tone wrong	Students are able to pronounce <i>zh</i> correctly, but unable to pronounce the combined vowel sounds and/or tones correctly.
<b>1 Fair</b>	<i>zh</i> wrong, but vowel and/or tone correct	Students are able to pronounce the combined vowel sounds and/or tones correctly, but unable to pronounce <i>zh</i> correctly.
<b>0 Poor</b>	Incorrect	Students are unable to pronounce <i>zh</i> correctly as well the combined vowel sounds and tones.

### Scoring Rubric for Research Question 3

**Question:** How does the proposed approach affect the learning of *zh* used in two-syllable words?

**Pre/Post-test items:** zhànzhē zhēnzhòng zhēngzhào zhuózhuāng

	<b>Accuracy</b>	<b>Elaboration</b>
<b>5 Superior</b>	Correct	Students are able to pronounce both <i>zh</i> 's correctly as well the combined vowel sounds and tones.
<b>4 Excellent</b>	Both <i>zh</i> 's correct, but vowel and/or tone wrong	Students are able to pronounce both <i>zh</i> 's correctly, but unable to pronounce the combined vowel sounds and/or tones correctly.
<b>3 Good</b>	One <i>zh</i> correct as well vowel and/or tone	Students are able to pronounce one of <i>zh</i> 's and the combined vowel sounds and/or tones correctly.
<b>2 OK</b>	One <i>zh</i> correct, but vowel and/or tone wrong	Students are able to pronounce one of <i>zh</i> 's correctly, but unable to pronounce the combined vowel sounds and/or tones correctly.
<b>1 Fair</b>	Both <i>zh</i> 's wrong, but vowel and/or tone correct	Students are able to pronounce the combined vowel sounds and/or tones correctly, but unable to pronounce <i>zh</i> correctly.
<b>0 Poor</b>	Incorrect	Students are unable to pronounce <i>zh</i> correctly as well the combined vowel sounds and tones.