Phonological Fossilization in the Prosess of Mandarin Native Speakers Learning Indonesian as a Second Language

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Abstract: Phonological fossilization, particularly in terms of pronunciation, presents a significant obstacle for second language learners in further advancing their language proficiency. Therefore, this study, grounded in the theory of interlanguage fossilization, aimed to investigate Mandarin native speakers learning Indonesian as a second language. By designing tests for the target group, collecting data on phonological fossilization, and analyzing the fossilized phonemes produced during the process of learning Indonesian, this research identified the underlying causes of phonological fossilization from both phonetic production and knowledge perspectives. Subsequently, corresponding strategies were proposed to overcome phonological fossilization, with the ultimate objective of improving the language skills of second language learners. This study contributes to the understanding of phonological fossilization in second language acquisition and offers practical insights for language instruction.

Keywords: phonological fossilization, pronunciation, second language learners, interlanguage fossilization, Mandarin native speakers, Indonesian as a second language, language instruction.

1. INTRODUCTION

Fossilization is a prevalent phenomenon in the process of second language acquisition, and it serves as a significant characteristic that distinguishes it from first language acquisition. In 1972, American linguist Larry Selinker formally introduced the concept of fossilization in his seminal work “Interlanguage,” which garnered substantial attention from researchers and language educators involved in the field of second language acquisition. Selinker’s research revealed that at a certain stage of second language learning, certain language features or grammatical rules in the learner’s interlanguage system tend to reach a stagnant state, regardless of the learner’s age or amount of study. This stagnation impedes second language learners from attaining the same level of language proficiency as native speakers, thus resulting in the phenomenon of fossilization. Scholars have extensively examined interlanguage phonetics, vocabulary, syntax, discourse, and pragmatics from various perspectives. However, there is a dearth of research investigating the phenomenon of interlanguage phonological fossilization in Mandarin learners of Indonesian as a second language. This study aims to address this research gap by analyzing interlanguage phonological materials obtained from a pronunciation test administered to 40 undergraduate students majoring in Indonesian language at a specific university. The characteristics and formation mechanisms of fossilized sounds will be examined, with the ultimate objective of

providing assistance to Mandarin native speakers learning Indonesian.

Indonesian is increasingly being learned as a second language by Mandarin native speakers. Universities such as Peking University, Beijing Foreign Studies University, Guangdong University of Foreign Studies, Shanghai International Studies University, Yunnan Minzu University, and Hefei University of Technology have established undergraduate programs in Indonesian language to meet the growing demand for language professionals in political, economic, trade, and personnel exchanges between China and Indonesia. This study focuses on the Foreign Language School of Hefei University of Technology and identifies certain errors commonly made by college students in the learning of Indonesian phonemes. If these errors are not corrected promptly, they may gradually lead to fossilization, impeding students' progress in achieving target-like pronunciation. To gain a deeper understanding of phonological fossilization, this study applies a combined quantitative and qualitative approach, based on the theory of interlanguage fossilization, to investigate the phenomenon of fossilized Indonesian phonemes among students at Hefei University of Technology. The objective is to provide necessary theoretical guidance for Indonesian phonetics instruction and promote the development of students' Indonesian phonological system.

2. THEORETICAL FRAMEWORK AND METHODOLOGY

Interlanguage is a term used to describe a language that exists between a learner's mother tongue and the target language. It represents the learner's language. If we consider the mother tongue and the target language as two endpoints on a line segment, then interlanguage can be seen as any point on that line segment. The interlanguage of beginners is closer to the mother tongue, while the interlanguage of proficient learners is closer to the target language. Statistics show that only about seven percent of learners can reach the target language endpoint on the line segment. Fossilization, also known as "stagnation phenomenon," is the twin brother of interlanguage. All interlanguages suffer from fossilization, which can be characterized as a common problem among learners: making the same errors repeatedly and reaching a plateau in language proficiency.

As the fundamental form of language, phonetics plays a crucial role. Research has shown that phonetic fossilization is often the first manifestation among all linguistic aspects and greatly hinders learners' overall language development. From a sociolinguistic perspective, the smallest unit that distinguishes meaning in phonetics is the phoneme, which includes segmental phonemes (consonants and vowels) and suprasegmental phonemes (stress, intonation, rhythm, and connected speech). Mastering segmental phonemes is the foundation of phonetic acquisition, making it a crucial step in learning Indonesian phonetics.

This study adopts a mixed-methods approach, combining qualitative and quantitative research methods, to investigate the phonetic fossilization phenomenon among students at Hefei University of Technology in their learning of Indonesian segmental phonemes. The methodology involves setting up phonetic tests to analyze students' pronunciation accuracy using both qualitative and quantitative methods. The errors are classified and statistically analyzed to identify common pronunciation issues and potential instances of fossilization.

3. RESEARCH DESIGN

3.1 Research Questions

Using a phonetic test as a tool, this study aims to address the following research questions among senior undergraduate students in the third and fourth year at Hefei University of Technology: (1) Is there a noticeable fossilization phenomenon in the Indonesian phonemes among the students? (2) Which phonemes are more prone to fossilization? (3) What are the main factors contributing to fossilization? (4) What teaching strategies can be employed to reduce the extent of fossilization in language instruction?

3.2 Research Participants

The participants in this study are students from the Indonesian Language Department at the School of Foreign Languages, Hefei University of Technology. There are a total of 40 participants, divided into two groups of 20 each, representing the third and fourth year levels. These students were chosen as ideal research participants for several reasons. Firstly, they are all studying Indonesian language within the same university, utilizing typical classroom teaching methods and having access to the same learning environment and teaching resources. This ensures a high level of representativeness among the participants.

3.3 Data Collection

For data collection, we initially designed a phonetic test that focused on phonemes and had students read out words. We took into consideration the variation in pronunciation due to different phonetic positions, such as allophones. We obtained a set of 29 word pairs, consisting of 23 consonant phonemes and 6 vowel phonemes. We distributed the test materials to the students, who then recorded themselves reading the words. Subsequently, we enlisted the help of a native Indonesian speaker from Jakarta, Indonesia (Ali, pseudonym, male, 24 years old, studying in Jinan University) to conduct perceptual evaluation and annotate the recorded words with the corresponding International Phonetic Alphabet (IPA) symbols.

Our investigation aims to assess the accuracy of Chinese native learners' standard Indonesian pronunciation and then use the calculation formula to obtain the pass rate of pronunciation acquisition. Disputes exist regarding the standard Indonesian pronunciation, but we adopt the Jakarta dialect, generally recognized by the academic circle, as the Indonesian standard. Indonesian phoneme variants are caused by different phoneme distributions. If the phonetic conditions of the phonemes change, the pronunciation results will be different, which can cause obvious differences in the sense of hearing.

The survey mainly examines consonant onset and the consonant coda situations in syllables. For Indonesian vowels, we mainly examine the pronunciation of students when the vowels are located at the beginning, middle, and end of syllables. When judging whether the sound conforms to the standard sound value, we rely on the category perception model theory (Liberman 1957). According to this theory, adherence to the range of phoneme hearing and discrimination suffices. Based on these considerations, we've outlined the following survey vocabulary:

Table 01 Indonesian phonetics acquisition survey vocabulary

No.	Consonomic phonetic variant	the onset consonant of the syllable	the coda consonant of the syllable
1	p	***p***akai, ***p***etik, ***p***ita	ata***p***, cake***p***, titi***p***, tutu***p***
2	b	***b***ayar, ***b***enar, ***b***ibir, ***b***ubar	seba***b***, Ara***b***, dara***b***, du***b***
3	t	***t***eman, ku***t***ip, ***t***okoh	mulu***t***, kabu***t***,
4	d	***d***amai, ***d***erajat, ***d***unia	aba***d***, masu***d***,suju***d***
5	k	***k***amu,***k***epiting,***k***urang	aju***k***, konta***k***, konfli***k***, tida***k***
6	g	***g***i***g***i, ***g***emuk, ***g***er***g***aji	gude***g***, nekrofa***g***,xilofa***g***
7	c	***c***epat, ***c***ara, ***c***u***c***u	
8	ɟ	***j***ari, a***j***ak,***j***emaah	fala***j***, mikra***j***,minha***j***
9	m	***m***akan, ***m***ana, ***m***ampu	sala***m***, baya***m***, benu***m***
10	n	***n***ama, a***n***ak, ***n***e***n***ek	ama***n***, ami***n***, ambe***n***
11	s	***s***ana, ***s***abar, ***s***ebelum, ***s***ubur	nana***s***, ala***s***, aktivita***s***
12	z	***z***akar, ***z***aman, ***z***ikir, ***z***ona	
13	h	***h***arus, ***h***ebat, ***h***ukum	istila***h***, dara***h***, musu***h***
14	x	***kh***usus, i***kh***las, ***kh***awatir	tari***kh***, sye***kh***
15	f	***f***aedah, ***f***aktor, ***f***ungsi,	tari***f***, intensi***f***, akti***f***, maa***f***
16	v	***v***ariasi, uni***v***ersitas, rele***v***an	
17	r	***r***apat, a***r***ah, a***r***us, ***r***umah	dama***r***, alu***r***, catu***r***
18	l	***l***ama, ***l***embut, ***l***utut	
19	j	caha***y***a,da***y***a,a***y***u	
20	w	***w***ujud, ***w***oltel,***w***arung	
21	ɲ	ku***ny***it, mi***ny***ak, mo***ny***et	
22	sj	***sy***arat, a***sy***ik, i***sy***arat	
23	ŋ	***ng***oko, ***ng***ebut, ***ng***eri	gunu***ng***, panci***ng***, aba***ng***
1	a	***a***man, ***a***da	t***a***k, s***a***h	pad***a***, s***a***n***a***
2	o	***o***mong, ***o***lor	t***o***k***o***h, cop***o***t	b***o***la,***o***pini
3	e	***e***nak, ***e***kor	***e***mb***e***k, ***e***f***e***k	d***e***mam, c***e***tak
4	ə		d***e***tik, t***e***rus	l***e***mah, k***e***luar
5	i	***i***man, ***i***ntan	iz***i***n, ad***i***k	jad***i***, p***i***ta
6	u	***u***kur, ***u***mat	lut***u***t, tut***u***p	k***u***k***u***, ab***u***

The list of consonant and vowel phonemes in the above table is obtained by referring to Tata Bahasa Baku Bahasa Indonesia (versi ke-4)(*Indonesian Standard Grammar (4th version)*). All illustrative words are selected from Kamus Besar Bahasa Indonesia (versi ke-5)(*Big Indonesian Dictionary (5th version)*). The selection of words sharing the same phoneme takes into consideration the diverse articulations of said phoneme in distinct positions, thereby capturing its various manifestations. Consonants are scrutinized in initial positions (as onsets), within the

middle of a word (as onsets or syllable endings), and at the word's conclusion (as syllable endings). However, vowels examined under three conditions: the core vowel located at the beginning of the word (the core vowel is independently formed into a syllable or just with a syllable end), the core vowel located between two consonants, and at the end of the word as the core vowel and without a syllable end. A total of 38 consonant phonemes and variants, a total of 6 vowel phonemes, at last a total of 44 phonetic variants were placed within the scope of our investigation.

3.4 Data Compilation

Following the formal phonetic test, we recorded a total of 34 audio recordings (19 from the third year and 15 from the fourth year). However, three recordings from the fourth year were deemed invalid due to incomplete readings and were excluded from the analysis. Hence, we obtained a total of 31 valid audio recordings. Subsequently, we proceeded with the compilation of the collected data, which involved three steps. First, we enlisted the assistance of Ali to transcribe the recordings of the 31 participants into International Phonetic Alphabet (IPA) symbols. Second, we marked any phonetic errors found in the transcriptions and extracted common errors, categorizing them accordingly. Third, we conducted a comparative analysis among different groups by calculating the proportions of participants making errors for each error category, considering factors such as vertical and horizontal comparisons as well as different proficiency levels.

4. RESEARCH FINDINGS

We conducted a statistical analysis of the acquisition rates by comparing the acquisition of each phonetic variant between the two groups. Among the third-year students (7th semester), they have fully mastered 26 phonemes, including p, t, k, m, -m, n, -n, s, -s, z, h, -h, f, -f, l, j, w, -ŋ, a, o, i, u, ɲ, g, d, b. On the other hand, the investigation of fourth-year students (7th semester) revealed that they have fully mastered 32 phonemes, including p, b, -b, t, -t, d, k, -k, g, -g, c, m, -m, n, -n, s, -s, h, -h, f, r, -r, l, j, w, ɲ, ŋ, -ŋ, a, o, i, u. This indicates an increase of six phonemes mastered compared to the third-year students (5th semester). Among these data, in the 7th semester, the group of students has increased their mastery of phonemes by six, specifically [-b], [-t], [-k], [-g], [c], [r], [-r], where four of them [c] (95%), [-b] (89%), [-t] (89%), [-g] (89%) are the second-highest proportions among the fully mastered phonemes in the 5th semester. This further demonstrates the continuity in the phonetic learning performance among different groups, with a larger denominator leading to more prominent patterns. The retroflex sound [r] (at the beginning of syllables) and [-r] (at the end of syllables) were the lowest in the 5th semester group (53%, 47%). However, in the 7th semester, both of these phonemes have become fully mastered and there is a possibility of sudden acquisition. In other words, there are significant differences among different groups in the acquisition of individual phonemes, such as the retroflex sound [r] and [-r]. In the phonetic learning process of the third and fourth year students investigated, we found that there are certain phonemes that need to be collectively fully mastered, as there are always different numbers of individuals who have not fully mastered them. We believe that, under the conditions of continuous acquisition time, the phonemes that have not yet entered the category of full mastery in the third

and fourth years are more prone to fossilization.

As mentioned earlier, sounds that remain unacquired in the third and fourth years are categorized as prone to fossilization. Survey results indicate that incompletely acquired sounds in the fourth school year include (12 in total) -p (92%)[1]、-d (92%)、ɟ (92%)、z (92%)、-f (92%)、sj (92%)、ə (92%)、-ɟ (83%)、e (83%)、v (75%)、x (58%)、-x (58%); the sounds not fully acquired in the third school year include(18 in total) sj (95%)、c (95%)、v (89%)、-p (89%)、ŋ (89%)、-b (89%)、-d (89%)、-t (89%)、-r (89%)、ə (84%)、-k (84%)、x (84%)、e (84%)、-g (74%)、-x (74%)、r (68%)、-ɟ (53%）. Based on our empirical investigation and statistical analysis, we have identified the range of fossilized phonemes among Indonesian learners whose first language is Mandarin Chinese. The fossilized phonemes include: [-p], [-f], [-b], [-t], [-g], [-d], [-k], [-r], [-ɟ], [-x], [c], [ɟ], [z], [sj], [v], [x], [r], [e], [ə].

5. DISCUSSION

In studies on the mechanisms and causes of fossilized sounds, much attention is given to the influence of mother tongue transfer. However, from a teaching perspective, it is important to narrow down the problem and determine whether the errors lie in incorrect placement of articulation, incorrect pronunciation methods, or a lack of understanding of the specific phonetic knowledge. I aim to identify the specific reasons for the formation of fossilized sounds and seek solutions. In the following discussion, I will explore these causes from the perspectives of phonetic production and cultural knowledge. I believe that errors in individual phonetic production and a lack of understanding of the relevant phoneme are two important causes of phonetic fossilization.

5.1 Analyzing the Causes of Fossilized Sounds from a Phonetic Production Perspective

In analyzing difficult-to-acquire phonetics, it is essential to distinguish between two aspects of phonetic acquisition: difficulty acquiring phonetic ability and lack of phonetic knowledge. Clear classification provides accurate guidance for language acquisition strategies.

Table 02 List of Indonesian phonetics from easy to difficult

No.	phonetics	First semester	phonetics	Third semester	phonetics	Fifth semester	phonetics	Seventh semester
1	p	100%	p	100%	p	100%	p	100%
2	t	100%	b	100%	b	100%	b	100%
3	k	100%	t	100%	t	100%	-b	100%
4	m	100%	d	100%	d	100%	t	100%
5	-m	100%	k	100%	k	100%	-t	100%
6	n	100%	g	100%	g	100%	d	100%
7	-n	100%	c	100%	m	100%	k	100%
8	s	100%	m	100%	-m	100%	-k	100%

[1] the proportion of students who have acquired these phonemes compared to the total number of students

9	-s	100%	-m	100%	n	100%	g	100%
10	z	100%	n	100%	-n	100%	-g	100%
11	h	100%	-n	100%	s	100%	c	100%
12	-h	100%	s	100%	-s	100%	m	100%
13	f	100%	-s	100%	z	100%	-m	100%
14	-f	100%	h	100%	h	100%	n	100%
15	l	100%	-h	100%	-h	100%	-n	100%
16	j	100%	f	100%	f	100%	s	100%
17	w	100%	-f	100%	l	100%	-s	100%
18	-ŋ	100%	l	100%	j	100%	h	100%
19	a	100%	j	100%	w	100%	-h	100%
20	o	100%	w	100%	ɲ	100%	f	100%
21	i	100%	ɲ	100%	ŋ	100%	r	100%
22	u	100%	sj	100%	-ŋ	100%	-r	100%
23	ɲ	89%	ŋ	100%	a	100%	l	100%
24	g	83%	-ŋ	100%	o	100%	j	100%
25	d	78%	a	100%	i	100%	w	100%
26	b	72%	o	100%	u	100%	ɲ	100%
27	sj	67%	i	100%	c	95%	ŋ	100%
28	c	56%	u	100%	-f	95%	-ŋ	100%
29	v	56%	-d	93%	-b	89%	a	100%
30	-p	50%	-g	93%	-t	89%	o	100%
31	ŋ	50%	z	93%	-g	89%	i	100%
32	-b	44%	-p	86%	v	89%	u	100%
33	-d	44%	-b	86%	sj	89%	-p	92%
34	-t	39%	-t	86%	e	89%	-d	92%
35	-r	39%	v	79%	ə	89%	ɟ	92%
36	ə	33%	-k	71%	-p	84%	z	92%
37	-k	28%	x	71%	-d	84%	-f	92%
38	x	28%	ɟ	57%	-k	84%	sj	92%
39	e	28%	-ɟ	50%	ɟ	84%	ə	92%
40	-g	22%	-x	50%	x	74%	-ɟ	83%
41	-x	22%	r	43%	-x	74%	e	83%
42	r	22%	-r	43%	-ɟ	68%	v	75%
43	-ɟ	17%	e	43%	r	53%	x	58%
44	ɟ	11%	ə	43%	-r	47%	-x	58%

First, phonetics acquisition difficulties due to lack of mastery of phonetics production ability. We believe that it is the task of perception ability to be able to distinguish the difference in sounds, and the production of sounds that are the same as the perceived sounds is the embodiment of sound production ability. In the third and fourth academic years of Indonesian language acquisition, it is

believed that sound perception is no longer the cause of sound difficulties, and the difficulties should occur during sound production. Difficulties in sound production ability can be subdivided into three situations, including (1) inaccurate positioning of the pronunciation position, (2) inadequate pronunciation method, or (3) errors in both. Below we will conduct an in-depth analysis of the results of this test survey. The method of pronunciation of consonant rhyme endings (consonants at the end of syllables) has yet to be mastered. The consonant rhyme ending is a series of sounds that the acquirer has not yet acquired in the third or fourth school year. The unacquired sounds of this type in the third school year are [-f], [-b], [-t], [-g], [-p], [-d], [-k], [-x], [-ɟ], and [-r], a total of 10 that accounts for 52% of the total number of all incompletely acquired sounds; a total of 5 in the fourth academic year, including [-p], [-d], [-f], [-ɟ], and [-x], accounting for 41%. That is, consonant rhyme endings become the largest group in the hardest-to-acquire phonetics for Indonesian language learners whose L1 is Chinese. The pronunciation position and pronunciation method of consonants have yet to be mastered. There are four sounds in this category, namely [c], [ɟ], [z], and [sj]. During the articulation process of hard palate voicelessed plosive [c], hard palate voiced plosive [ɟ], and alveolar voiced fricative [z], learners simultaneously control oral articulation organs to accurately position the hard palate and let the vocal cords vibrate at the same time. There is difficulty in its control ability, so the learner cannot produce the sounds of [c] and [ɟ]. In addition, it is difficult to properly control the surface of the tongue and the tip of the tongue to produce the dorsal consonants [c] and [ɟ] and the apical consonant [z] respectively, and learners have blurred areas in distinguishing the surface of the tongue from the tip of the tongue. In addition, [sj] in Indonesian is a sound between [s] and [ɕ]. Because it is difficult to grasp its pronunciation position, learners usually pronounce it as [s] or [ɕ]. Sometimes it is also pronounced as a retroflexed fricative sound [ʃ]. The complete acquisition rate of trill [r] has been low. The alveolar trill [r] in Indonesian is a very distinctive sound for Chinese native speakers, but the high degree of distinction does not mean that it is easy to acquire. There are three main points in the pronunciation of trill [r]. One is that the pronunciation method of trill [r] is vibrating, and the airflow is guided to the pronunciation organ to vibrate the tongue to pronounce. If the learner cannot vibrate, he/she can only produce the flowing sound [ɻ] in the Chinese phonetic system or the premature sound that does not exist in Chinese nor Indonesian. That is, the flapping sound [ɾ]. The second is that the pronunciation position is the postalveolar. The key for learners to achieve accurate positioning when pronouncing [r] is to use the tip of the tongue against the upper postalveolar ridge; During the survey, many students had wrong pronunciations such as [tr], [l], [ur] due to the wrong pronunciation positions; The third is that the vocalization type is voiced, which means that the vocal cords vibrate during pronunciation. If the state of the vocal cords cannot be accurately controlled, the voiceless vibrato [r̥] may be produced, which is also an aborted sound. It can be seen from this that if the pronunciation position and pronunciation method are not in place, it is impossible to produce accurate L2 sounds of the target language.

Second, phonetics recognition difficulties due to lack of knowledge. This means that the reason for the non-acquisition of pronunciation is the failure of pronunciation identification caused by the lack of mastery of the target language pronunciation knowledge, as follows:

(a) [ə] and [e] cannot be distinguished, and there is a phenomenon of mixed reading between the two. In the Indonesian writing system, both [ə] and [e] are represented by the letter e. If they do not master the actual pronunciation of a syllable, as Indonesian learners, they may find judging whether e is pronounced as [ə] or as [e] to be difficult. From this point of view, this is not the difficulty of pronunciation acquisition brought about by pronunciation ability but caused by the lack of pronunciation knowledge.

(b) There are differences in pronunciation between written and vernacular phonemes. In spoken Indonesian, words containing /v/ are mostly English loanwords. After these loan words entered Indonesian, the pronunciation of /v/ changed from the originally voiced consonant to a voiceless consonant, /v/ and Indonesian /f/ phonemes merged into the same phoneme /f/, but {v} is not merged with {f} in the Bahasa Indonesian writing system and is still written separately. Most Chinese native speakers do not have this knowledge. Under the influence of Chinese and English, [v] is usually pronounced as [v] or [w]. In fact, it should be pronounced as [f] in Indonesian vernacular.

(c) The velar fricative [x] in Indonesian is represented by the letter {kh}. In Indonesian, words containing kh[x] are rare and usually loanwords. In addition, using the letter {kh} to represent [x] will allow the learner to be hinted by the letter, and {kh} should be pronounced as [h] or [k] according to the principle of consistency in phonetics and writing. According to the survey results, many errors related to {kh} are caused by this.

(d) There is the over-generalization of newly learned rules. The phonemes /f/ and /ɟ/ are pronounced [-f], [-ɟ] when they are at the end of a syllable, and their pronunciations are the same as [f] and [-ɟ] at the beginning of a syllable. However, learners have generally transferred the way of pronouncing plosive rhyme endings as unobstructed sounds. That is, they subconsciously believe that when consonants are at the end of syllables, they should be pronounced this way, which is the performance of generalization of rules in the process of second language learning.

6. PEDAGOGICAL IMPLICATIONS

Based on empirical research findings and an analysis of the causes of phonemic fossilization, the following conclusions can be drawn: the occurrence of phonemic fossilization in students, particularly those whose native language is Mandarin Chinese and are learning Indonesian as a second language, is largely due to inadequate teaching and knowledge gaps. Therefore, we propose the following pedagogical strategies to help these learners reduce the degree of phonemic fossilization.

(1) Recognize the impact of negative transfer from the native language: Teachers should help students overcome the negative influence of their native language on the target language pronunciation. In phonetic instruction, teachers can explain the differences between the Indonesian

and Mandarin Chinese phonetic systems, guiding students to be aware of the phonemes that may lead to fossilization and enhancing their phonetic awareness to avoid negative influences from their dialects.

(2) Provide effective corrective feedback: Language teachers should provide timely corrective feedback in phonetics classes. The feedback should be based on positive affect and create a relaxed and harmonious learning atmosphere. When students make pronunciation errors, teachers should skillfully point out the mistakes and patiently help them correct them to maintain their motivation for learning.

(3) Provide high-quality phonetic input: Teachers can use high-quality audio materials during instruction and download videos or audio programs suitable for learners' language proficiency from the internet. By imitating high-quality input materials for pronunciation practice, students can overcome pronunciation difficulties and reduce the degree of phonemic fossilization. Additionally, teachers can use multimodal presentation techniques such as images and videos to enhance teaching effectiveness.

(4) Enhance teachers' phonetic proficiency: Teachers should focus on improving their own phonetic proficiency. Currently, some teachers lack professional phonetic knowledge and their own pronunciation may be fossilized, making it challenging for them to provide guidance and demonstration in the classroom. Therefore, teachers should continuously enhance their phonetic skills and become good role models for students to help them overcome phonemic fossilization.

(5) Utilize appropriate phonetic teaching methods: Teachers can creatively use various teaching methods and techniques, such as incorporating games and task-based instruction. Through these activities, students can maintain a sense of novelty in learning, spark their interest, enhance their motivation, and help eliminate phonemic fossilization.

By implementing these proposed improvement measures, teachers can assist students in overcoming phonemic fossilization, improving their phonetic abilities and accuracy. These strategies emphasize the professional and personalized guidance of teachers, as well as creating a positive learning environment and utilizing multimedia technology, thereby providing students with a better phonetic learning experience and outcomes.

7. CONCLUSION

This study aimed to investigate the phenomenon of phonemic fossilization, its causes, and pedagogical strategies in Mandarin Chinese speakers learning Indonesian as a second language. The research findings indicate that phonetic learning plays a crucial role in acquiring Indonesian, and effective teaching strategies are needed to address the issue of phonemic fossilization. The main causes of phonemic fossilization are found to be interference from Mandarin Chinese as the native language, lack of exposure, and individual learning differences. To prevent phonemic fossilization, it is suggested to emphasize phonetic instruction, minimize negative transfer from the native language, cultivate learning strategies, and maintain a positive learning motivation. Additionally, the proficiency of teachers in phonetics is also crucial. By implementing these strategies, phonemic fossilization can be minimized, and students' phonetic awareness and

proficiency in Indonesian can be improved. Future research can further explore the phenomenon of phonemic fossilization and seek additional effective teaching strategies to help learners overcome phonemic fossilization and enhance their phonetic proficiency.

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