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Analysis of the Meaning of Functional Load for English Pronunciation Teaching at a Cross-Cultural Bilingual University

— Taking Wenzhou-Kean University as an Example

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Abstract: Wenzhou-Kean University (WKU) is a Sino-American collaborative university where Chinese students communicate in English with professors and peers having diverse English accents. Through such interactions, these students seem to naturally develop an awareness of pronunciation modification. Since pronunciation teaching is not yet emphasized at WKU, this study preliminarily examined if traditional factors affecting functional load (FL), for example, the number of minimal pairs, the difference between consonants and vowels, word frequency, and language context made sense for teaching phonemic contrasts at WKU. At the same time, students' perceptions of interaction's effect on pronunciation awareness were assessed. The researcher collected and analyzed attitudinal data from 114 WKU students with different English learning goals. It turned out that emphasizing teaching traditional high FL mistakes, consonant contrasts, and frequently used spoken words might not be necessary at WKU. Instead, through natural interactions in an English as an International Language (EIL) environment, students seemed to have identified important pronunciation mistakes among Chinese learners, tolerated those mistakes not hindering understanding, and practiced perceiving the meaning of accented words through language context.

Keywords: Functional load, Pronunciation teaching, Minimal pairs, Wenzhou-Kean University, Interaction.

1. Introduction

Traditionally, the Functional Load (FL) of a pair of phonemes is measured by the number of minimal pairs it creates [1]. Confusing high FL phonemes that produce multiple minimal pairs means that the meaning received by the listener is more likely to change, so it is important to focus on those particular phonemes in English pronunciation teaching. However, more applied linguists find FL's significance in pronunciation teaching is not limited to the number of minimal pairs. The frequency of occurrence of members of minimal pairs in actual communication, the similarity of acoustic features of phonemes, and the language contexts of members' occurrence all influence FL [2]. Recently, Sewell questions the idea of prioritizing high FL errors in pronunciation teaching, arguing that ELLs speaking different

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L1 have their unique pronunciation problems and that they realize and correct pronunciation problems that hinder understanding through natural interactions [3].

As a cross-cultural bilingual university in China, Wenzhou-Kean University (WKU) reflects well the idea of interacting in English as a lingua franca. WKU adopts a full-English teaching system, but its students all speak Chinese after class. In classrooms, students speak English with professors and peers coming from both inner, outer, and expanding circles of English. As WKU students progress into higher levels of study, they seem to gradually accept and understand different English accents. Nevertheless, some of them feel like changing English accents to more "standard" ones for more positive personal images and smoother communications with native English speakers [4]. Since pronunciation teaching is neglected in ESL training for WKU freshmen, this study explored meaningful aspects of pronunciation teaching for WKU students from the perspective of FL. It also examined Sewell's notion that students learn to correct their pronunciation mistakes through natural interactions [3].

Many studies have focused on factors that influence FL and whether a particular factor makes sense in teaching or assessing English pronunciation. This study synthesized previous scholarly discussions of FL and examined the applicability of each at a cross-cultural bilingual university. Also, previous studies have emphasized helping English speakers better adapt to native pronunciation norms, whereas this study aimed to find strategies that prepare students for better communication with peers and teachers with different English accents, or more broadly, in a "World Englishes" setting.

2. Scholarly Notions of Functional Load in Pronunciation Teaching

2.1. Minimal Pairs

King synthesizes the discussion of the Prague Circle and defines FL as a measure of the extent to which a pair of phonemes can differentiate utterances [1]. It is namely that the more minimal pairs (words only differ in one sound) are created, the higher FL that set of sounds carries. This is endorsed in Catford's view of pronunciation teaching, as it argues that the functional load of a phonemic contrast is characterized by "the number of words in which it occurs in the lexicon" [5]. Catford also suggests that teachers should prioritize those pairs of phonemes with high FL.

Brown argues that the number of minimal pairs and the frequency of minimal pairs' occurrence are the most important in measuring FL [2]. Nevertheless, the FL of phonemic contrast differs in different English dialects, as different dialects may conflate different sounds without reducing understanding [2]. Also, when conflating sounds that have similar acoustic features, it is unlikely that misunderstanding will happen [2]. Sewell also suggests that students with different L1 backgrounds tend to have different problems that specifically hinder understanding [3]. This should also be taken into account in calculating FL [2]. Specifically for Chinese learners, /n/ and /l/, /k/ and /g/, /f/ and /h/, /ɪː/ and /ɪ/, and /aɪ/ and /æ/ are popularly conflated pairs [6, 7]. Not all of them are also listed as having high FL by Catford [5].

Some empirical studies have later verified the importance of high FL segments in teaching standard English pronunciation. Munro and Derwing make native English speakers rate the accentedness and comprehensibility of speech featuring high and low FL mistakes [8]. It turns out that high FL mistakes are more related to low perceived ease of understanding and that the accumulation of high FL mistakes significantly affects comprehensibility instead of accentedness [8]. Further, Suzukida and Saito find that high FL segmental mistakes are significantly more negatively correlated with speech comprehensibility, and both Oh et al. and Suzukida and Saito find that consonant mistakes generally have a stronger influence on comprehensibility than vowel mistakes [9, 10]. Moreover, Kang and Moran discover that higher-level English speakers tend to make fewer high

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FL mistakes, especially consonant mistakes, in an English proficiency exam [11]. All these findings suggest the need to emphasize high FL consonants in both English teaching and assessment.

2.2. Word Use and Language Context

Besides the number and frequency of minimal pairs, Brown proposes that the differences in the actual usage frequency, the part of speech, and the language contexts of two members of minimal pairs affect the FL of phoneme contrasts [2]. The more distant are members in terms of these categories, the less likely misunderstanding will happen. Further, from a variationist perspective, Wedel et al. suggest that FL is associated with the change and gradual selection in the use of phonemes and related words [12]. Through a spoken corpora approach, Levis and Cortes examine minimal pairs featuring popular sound contrasts from textbooks, finding that while members of many minimal pairs' have the same part of speech, 50% of minimal pairs are potentially useless for teaching because their members are seldom used [13]. Pairs such as /s/ and /θ/ are considered to have low FL in Catford's list and create uncommon and distant members of minimal pairs [5, 13]. Thus, Levis and Cortes contend that phoneme contrasts creating words that are both commonly used should receive more attention in teaching.

2.3. Interactions and Individual Differences

Pennington suggests that learning the sounds of a second language is also an interactive and psychological process [14]. Sewell contends that the traditional ranking of FL should be reconsidered from the practical communication perspective – through natural interactions, students gradually correct high FL mistakes and know what sound aspects are more important for mutual understanding [3]. Issacs also proposes the idea of integrating pronunciation teaching with repetitive communicative activities, as they reinforce perceptions of better pronunciations, urge students to create better sounds, and facilitate the exchange of useful sound information for future interactions [15]. Psychologically, the traditional assumption that conflating sounds makes people perceive another member of the minimal pair is also incomplete [3]. Weber and Cutler discover that pronunciation mistakes, for example, saying "barrens" for "balance", can activate the perception of competitor words, for example, "barrow", that are not members of minimal pairs [16].

English serving as a lingua franca indicates that ELLs can communicate in English both within their own L1 groups and with those "inner-circle" users such as Americans and Australians [17]. Wells claims that the teaching of pronunciation should consider students' personal needs to communicate with native or non-native speakers [18]. Further, from Jenkins' Lingua Franca Core perspective, Wells recommends comparing the L1 and English sound systems and finding L1 speaker-specific mistakes that hinder understanding in the context of teaching English as an International Language (EIL) [18, 19].

The above discussions in part 2.3 suggest that the ranking of FL for teaching should take into account the real communication factors, for example, the need and goal for interactions, the mistakes specifically for some L1 learners, and the cognitive processes in speech interactions.

3. Methodology

3.1. Study Design

In this study, a questionnaire was used to collect data from at least 100 WKU junior and senior students. This was to ensure all participants have already been exposed to different English accents at WKU. The questionnaire was distributed through social media platforms. Receivers first read the

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cover letter that introduced the study and asked for their consent and then decided whether to proceed to questions as a participant. Any participant could leave anytime when filling out the questionnaire.

The questionnaire consisted of four parts. It surveyed students' perceptions of sound and teaching, as perception is important for and as necessary as producing sounds [18, 20, 21]. The first part asked participants about their biggest purpose to learn English so that the researcher could check if there was a need to adjust pronunciation teaching for students with different language goals. The second part asked participants about their perceived ease of understanding sounds featuring certain FL mistakes. For example, to check if participants could understand mistakes often made by Chinese ELLs, "I can understand it when people say 'lame' (/leɪm/) for 'name' (/neɪm/)" was asked. To verify the notion that interaction matters in pronunciation teaching, the third part included statements such as "by interacting with professors with different English accents, I get to realize my own pronunciation mistakes". In parts 2 and 3, students chose 1-5 to indicate how much they agreed with the statements. Finally, there was an open-ended question asking students about their thoughts on the survey questions and giving the researcher directions in describing and interpreting numerical data.

After data collection stopped, data was analyzed and presented. The participant information and data collected are properly stored and do not go anywhere else.

3.2. Data Analysis Technique

For each statement, the average score received was automatically calculated by the questionnaire platform. The scaled response for each statement was "Strongly Disagree (1.0-1.5), Disagree (1.51-2.5), Undecided (2.51-3.5), Agree (3.51-4.5), Strongly Agree (4.51-5.0)". For the second part, the better average comprehensibility participants had, the lower need is there for teaching. For the third part, the more participants agreed that interaction promotes certain aspects of pronunciation, the more it shows that interaction works effectively. The standard deviation (SD) of each statement was also checked to decide if participants' conditions could be generalized.

Pie charts and bar graphs were used to visualize the data collected. The t-Test was conducted to check the difference in students' perception of two types of pronunciation mistakes. ANOVA was also used to check if there was a significant difference in the perception of sounds among students with different English-learning goals. The level of significance in this study was set as 0.05.

4. Results and Discussion

4.1. Participant Profile

114 WKU junior and senior students participated in the study. 42 (36.84%) wished to communicate like a native speaker or to communicate with native speakers effectively, 60 (52.63%) wished to use English as an international language in the global context, and 12 (10.53%) mainly used English to deal with study and exams. These respectively correspond to Wells' "native, EIL, and EFL" goals for English teaching [18].

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4.2. Understanding of English Speech Featuring Different Functional Load Mistakes

4.2.1. Phonemic Contrasts with High Cumulative Frequency or Creating Many Minimal Pairs (Traditional FL Mistakes)

Table 1: Comprehensibility of Brown's High FL Mistakes [2].

Item	Content	Mean	SD	Comprehensibility	Need for teaching
1	/iː/ and /ɪ/ conflation	3.89	0.643	High	Low
2	/e/ and /æ/ conflation	3.68	0.980	High	Low
3	/p/ and /b/ conflation	3.05	1.240	Average	Average
	Overall	3.54	0.954	High	Low

Students' comprehensibility of pronunciation mistakes featuring Brown's phonemic contrasts with high cumulative frequency or creating many minimal pairs was assessed [2]. Table 1 shows an overall high level of comprehensibility and thus a low need to teach these contrasts to WKU students. Brown's most important factors in determining FL may not suit WKU's context.

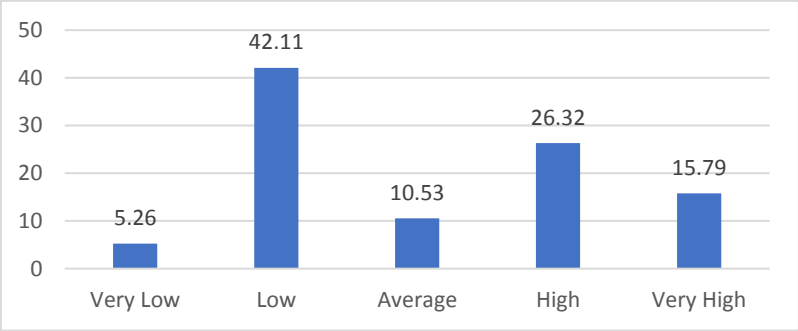

Figure 1: Comprehensibility of /p/ and /b/ conflation mistakes.

However, specifically, the need for teaching consonant contrasts seems to be higher than that for vowel contrasts. Moreover, Figure 1 and the SD (1.240) for students' comprehensibility for /p/ and /b/ conflation mistakes suggest there is a clear line between students who may need instructions on consonant contrasts featuring traditional high FL (47.37%) and not (42.11%).

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4.2.2. Popularly Conflated Phonemes by Chinese ELLs

Table 2: Comprehensibility of Chinese-specific Pronunciation Mistakes.

Item	Content	Mean	SD	Comprehensibility	Need for teaching
4	/n/ and /l/ conflation	3.00	1.081	Average	Average
5	/k/ and /g/ conflation	2.95	1.104	Average	Average
6	/aɪ/ and /æ/ conflation	2.95	1.151	Average	Average
1	/iː/ and /ɪ/ conflation	3.89	0.643	High	Low
	Overall	3.20	0.995	Average	Average

Overall, Table 2 shows an average need for teaching popular pronunciation mistakes for Chinese ELLs, whether they are listed high FL (Items 4 and 5) by Catford or not (Item 6) [5]. However, the SD for Items 4 to 6 suggests the difference in students' comprehensibility for Chinese-specific mistakes. Specifically, the same proportions (42.1% and 42.1%) of students respectively felt that /n/ and /l/ conflation were difficult to understand and not. Similar situation is true for /k/ and /g/ conflation (42.1% and 41.58%) and /aɪ/ and /æ/ conflation (47.37% and 36.85%). It seems that for some WKU students, teaching Chinese-specific pronunciation problems is needed.

Table 3: t-Test Result for the difference between Traditional High FL and Chinese-specific Mistakes.

t-Test: Two-Sample Assuming Equal Variances		
	Comprehensibility: Traditional FL mistakes	Comprehensibility: Popular mistakes for Chinese ELL
Mean	3.5439	3.1974
Variance	0.4863	0.5149
Observations	114	114
Pooled Variance	0.5006	
Hypothesized Mean Difference	0	
df	226	
t Stat	3.6974	
P (T<=t) one-tail	0.0001	
t Critical one-tail	1.6516	
P (T<=t) two-tail	0.0003	
t Critical two-tail	1.9705	

The t-Test result shown in Table 3 shows a significant difference ($p=0.0001<0.05$) between students' comprehensibility of traditional FL and Chinese-specific mistakes. The mean score of comprehensibility for traditional FL mistakes (3.54) is significantly higher than that for Chinese-specific mistakes (3.19), indicating a stronger need to teach the latter to WKU students. The result is consistent with Brown's idea of popular conflations by L1 and Sewell's and Wells' implications for L1-specific pronunciation instruction [2, 3, 18].

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4.2.3. Consonants and Vowels

Based on the participant means for consonants (Items 1, 2, and 6) and vowels (Items 3, 4, and 5) in 4.2.1 and 4.2.2, a t-Test was conducted, and it showed no significant difference between student perceptions of consonant and vowel mistakes ($p=5.82>0.05$). This contradicts Oh et al. and Suzukida and Saito's findings that consonants have a higher FL than vowels [9, 10]. Although by mean scores, students showed worse comprehensibility in consonant mistakes (3.00 for consonants and 3.51 for vowels), this result is maybe due to the finding in 4.2.2 that students were sensitive to both popular consonant and vowel mistakes for Chinese ELLs.

4.2.4. Minimal Pair Members' Frequency in the Spoken Corpora

The SD for Items 7 and 8 in Table 4 suggest that the need for teaching minimal pairs according to members' frequency of use cannot be generalized as "Average". In fact, more than half (57.9%) of students did not have trouble differentiating "leave and live" or "heat and hit", while only about one-fourth (21.05%) of them found this difficult. In the open-ended question, 15.79% of all participants questioned the meaning of Item 7 by either saying that they could decide the meaning through the context or that they did not find such pairs sounding different, which supports the result for /iː/ and /ɪ/ contrast in 4.2.1 and 4.2.2. From Sewell's natural interaction perspective, Chinese ELLs at WKU may be more adapted to this popular conflation in their own English communication and are less sensitive to such contrasts [3]. Thus, Levis and Cortes' implication for teaching pairs with similar high frequency in American spoken English may have not considered the profile of ESL students and be only helpful for those who aspire to sound native in spoken English [13]. More paradoxically to Levis and Cortes' suggestions, more students (36.84%) felt it difficult to differentiate minimal pair members with one being extremely unusual [13]. Also, the t-Test showed that students' perceived difficulty in Item 7 was significantly lower than that in Item 8 ($p=0.029<0.05$). Given Jenkins' finding that /θ/ conflation does not cause misunderstanding among non-native speakers' interactions, this result may be due to ESL students' familiarity with more common words and difficulty in identifying the relatively less frequent ones when sounds are conflated [19].

Table 4: Difficulty in Differentiating Minimal Pair Members with (Dis)similar Frequency of Occurrence.

Item	Content	Mean	SD	Difficulty of Understanding	Need for teaching
7	Conflating words that only differ in one sound but are all very commonly used in speaking (e.g., "leave /liːv/" and "live /lɪv/"; "heat /hiːt/" and "hit /hɪt/")	2.58	1.047	Moderate	Average
8	Conflating words that only differ in one sound, while only one word is extremely uncommon (e.g., "think /θɪŋk/" and "sink /sɪŋk/")	2.84	1.044	Moderate	Average

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4.2.5. Minimal Pair Members Used in the Similar Language Context

Table 5: Difficulty in Differentiating Minimal Pair Members Belonging to the Same Language Context.

Item	Content	Mean	SD	Difficulty of Understanding	Need for teaching
9	Conflating words that only differ in one sound but are used in a similar context, (e.g., "fate /feɪt/" and "faith /feɪθ/", "trek /trek/" and "track /træk/", or "sherry /ˈʃeri/" and "cherry /ˈʧeri/")	3.63	0.989	High	High
	Overall	3.63	0.989	High	High

Table 5 shows a high need for teaching WKU students minimal pair members belonging to the same language context. This is in line with Brown's criteria and Levis and Cortes' argument that deciding meaning is a job of decoding not only sounds but also semantics and pragmatics [2, 13]. The result also corresponds with the aforementioned (in 4.2.4) participants' perceived ability to differentiate words through different "contexts". Thus, when contexts are similar and sounds are similar, it can be difficult for students to decide the exact word they hear.

4.2.6. Perception of Competitor Words

Overall, the SDs in Table 6 suggest that students have individual differences in perceiving non-existent and competitor words when there are pronunciation mistakes. Figure 2 shows that 42.11% of students were sure that they were not confused about non-existent words, while 31.58% of them who felt confused cannot be neglected. Figure 3 shows that there were equal proportions (36.84% and 36.84%) of students who were certain that they perceived competitor words or were not too sure. Sewell's notion of considering potential non-existent and competitor words in calculating FL may make sense for teaching some individuals [3].

Table 6: Perception of Non-existent words or Competitor Words.

Item	Content	Mean	SD	Level	Need for teaching
10	Feeling confused about pronunciation mistakes that create non-existent words (e.g., saying "loisy /lɔɪzi/" for "noisy /nɔɪzi/")	2.95	1.240	Moderate	Average
11	When someone makes pronunciation mistakes, for example, saying "barrens /bærənz/" for "balance /bæləns/", "tay /teɪ/" for "tie /taɪ/", or "A-lid /eɪlɪd/" for "eyelid /aɪlɪd/", other unrelated but similar-sounding words sometimes come into the mind, for example, "barrows", "tail", or "alien"	3.16	1.044	Moderate	Average
	Overall	3.06	1.142	Moderate	Average

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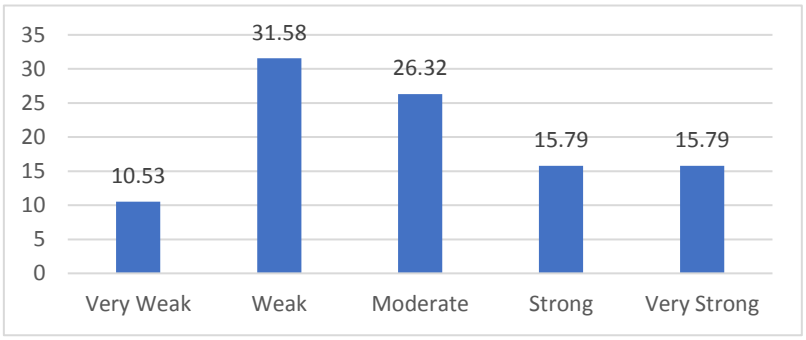

Figure 2: Confusion of Non-Existent Words.

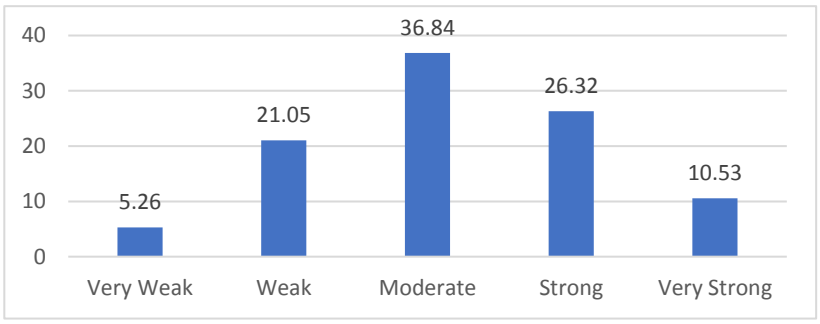

Figure 3: Perception of Competitor Words.

4.3. Learning Pronunciation through Natural Interaction

Tables 7 and 8 show that overall, interacting with professors with different English accents and Chinese peers who share similar English pronunciation problems may be effective for students to understand different accents, become more aware of accent diversity, and realize and correct pronunciation mistakes. More importantly, through such interactions, students seem to develop tolerance of their common pronunciation mistakes that do not hinder speech comprehensibility, as well as the awareness of those really hinder communication. The discussions in 4.2.2 and 4.2.4 can give direct evidence to this – students found some of Chinese ELLs' popular mistakes (e.g., /iː/ and /ɪ/ conflation) and many traditional high FL mistakes not hindering understanding, but they were significantly more sensitive to many other popular mistakes among Chinese ELLs. All of these imply that students may have adapted to communicating in a global English environment featuring Chinese-styled English and other Englishes. Nevertheless, there were still 42.14% of students disagreed or were not sure if they would correct pronunciation mistakes by talking to NNS professors. Also, for Item 19, there were still 47.37% of students did not really agree that interacting with other Chinese classmates helped them correct important pronunciation mistakes. This can be probably explained by student attitudes in the open-ended question part – 26.3% of all participants doubted the idea of correcting pronunciation mistakes through interacting with NNS of English because they believed that NS of English would be better for them to realize pronunciation mistakes.

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Table 7: Pronunciation Awareness Raised by Interacting with Professors with Different Accents.

Item	Content	Mean	SD	Level	Effectiveness
12	Tolerance of accented spoken English of professors who are NNS of English	4.11	0.721	Strong	Effective
13	Comprehensibility of accented English of professors who are NNS of English	3.53	0.755	Strong	Effective
14	Awareness of own pronunciation problems through interacting with professors with different English accents	3.58	0.940	Strong	Effective
15	Willingness to correct pronunciation mistakes through interacting with professors with different English accents	3.68	1.083	Strong	Effective
	Overall	3.73	0.875	Strong	Effective

Table 8: Pronunciation Awareness Raised by Interacting with Other Chinese Classmates.

Item	Content	Mean	SD	Level	Effectiveness
16	Tolerance of accented spoken English of other Chinese students	3.89	0.791	Strong	Effective
17	Comprehensibility of accented English of other Chinese students	3.84	0.878	Strong	Effective
18	Realizing important pronunciation problems for Chinese ELLs (i.e., those Chinese-specific problems that hinder understanding) while ignoring those problems that are not important	3.78	0.940	Strong	Effective
19	Willingness to correct important pronunciation mistakes through interacting with other Chinese students with a Chinese-styled English accent	3.42	1.045	Moderate	Moderate
	Overall	3.73	0.913	Strong	Effective

The above shows the ambivalence of students in a cross-cultural bilingual university with both NS and NNS of English – they are somehow adjusted to accent diversity, but they are also sensitive to significant pronunciation problems among themselves and hope to acquire "standard" English pronunciation. Sewell's argument, that students automatically find important aspects of pronunciation for themselves through interactions under a specific language environment, seems to make sense for the WKU context [3]. Not all traditional high FL contrasts and Chinese-specific mistakes were deemed to cause a change in meaning by WKU students, and student interaction can be considered in calculating the FL of sound contrasts being taught at WKU.

4.4. Testing the Differences among Students with Different English Learning Goals

ANOVA test was conducted to test if there were differences in the need for pronunciation teaching among students who wished to speak English like a native speaker, use English as an international language (EIL-oriented), and merely use English as a tool. The aspects checked include:

- The need for teaching traditional FL mistakes (p-value=0.931>0.05)
- The need for teaching phonemes that are popularly conflated by Chinese ELLs (p-value=0.002<0.05)

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• The need for teaching minimal pair members that are all commonly used in a similar context in speaking (p-value=0.165>0.05)

• The pronunciation modification awareness raised through interacting in an international English setting (p-value=0.199>0.05)

• The perceived ease of understanding non-native English accents (p-value=1.26>0.05)

Table 9: Testing the Difference in the Need for Teaching Popular Pronunciation Mistakes by Chinese ELLs.

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Native-level oriented	42	145.5	3.464286	0.446864
EIL oriented	60	178.5	2.975	0.539619
Tool oriented	12	40.5	3.375	0.153409

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	6.337782	2	3.168891	6.7844	0.00166	3.078057
Within Groups	51.84643	111	0.467085			
Total	58.18427	113				

The only significant difference found was in students' comprehensibility of popular pronunciation mistakes made by Chinese ELLs. Table 9 shows the ranking of comprehensibility: Native-level oriented (3.46) > Tool-oriented (3.38) > EIL-oriented (2.98). Thus, the ranking of the need for teaching is Native-level oriented students < Tool-oriented students < EIL-oriented students.

The result is in line with Wells' emphasis on teaching popular L1-speaker-specific pronunciation mistakes in the EIL context because some of them are simply unintelligible [18]. Maybe because higher-level students are able to pronounce better and perceive different sounds better, and those who merely use English for schoolwork do not often communicate in English or care about their pronunciation, there is a lower need to teach these students.

5. Conclusion

5.1. Summary of Findings

In terms of English learning goals, WKU students may generally wish to achieve native proficiency or to use it effectively in the global context, with the number of the latter slightly higher than the former. Based on the results of this study, the following arguments about the meanings of FL at WKU are also made: Catford's and Brown's traditional emphasis on phonemic contrasts based on numbers and cumulative frequency of minimal pairs may not be applicable for oral discourse training at WKU [2, 5]. Also, for WKU students, consonants do not seem to have a significantly higher FL than vowels. Moreover, at WKU, the pragmatics and semantics may have a strong effect on FL, while the usage frequency of the word in the native English corpora may not.

The t-Test result suggests that sounds popularly conflated by Chinese learners are more important than the number and frequency of minimal pairs in calculating the FL of phoneme contrasts for WKU students. These popular mistakes may be of greater importance to teaching at WKU. Further, the

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ANOVA result shows that teaching these mistakes are especially important for EIL-oriented students. Practical interaction situations probably play a part in affecting FL at WKU. First, some students perceive competitor words and feel confused about non-words when there are pronunciation mistakes. Second, interacting in a diverse English context may have helped students become more tolerant or aware of certain pronunciation mistakes' effect on perceived meaning. Specifically, some students seem to have known the important pronunciation issues of their own group and ignored issues that do not affect understanding in communication at WKU. Finally, maybe because of learnings from professors with "standard" English accents, some students would expect to correct their pronunciation mistakes through interacting with NS of English.

5.2. Suggestions for Pronunciation Teaching at Cross-cultural Bilingual Universities

For English pronunciation teaching at cross-cultural bilingual universities such as WKU, there is probably no need to particularly emphasize the list of traditional high FL mistakes, consonant contrasts, or the pronunciation of popular spoken words. It can be more meaningful to teach popularly conflated sounds in students' L1 groups, as well as minimal pairs used in similar semantic and pragmatic contexts. This may be because communicating with people with different English accents on a multicultural campus has enabled them to find significant English pronunciation problems in their L1 group while adapting to communicating in the "international English" setting. At the same time, students may have practiced judging meaning from context by communicating with people with heavy accents. To illustrate, at WKU, some professors make traditional high FL mistakes, for example, sounding /b/ when it should be /p/; many of their students would tease that they "sound awkward, but at least I can understand them", indicating signs of gaining intelligibility of even serious pronunciation problems through natural communication. Cross-cultural bilingual universities with an EIL context can bravely create a diversified accent environment for students without worrying that this will mislead students. Inspired by Issacs' suggestion of adding communicative activities in pronunciation teaching, the oral English training program at WKU can push students to talk in English with professors and peers having different English accents and then assess students on their findings of pronunciation and understanding problems in natural dialogues, to prepare students for future smooth communication in a "World Englishes" setting [15]. Students may explore which sound contrasts are important for smooth understanding under different communication circumstances or according to their own communication needs and experiences. Based on this, students in an EIL environment should still be encouraged to interact with NS of English because it helps correct some serious pronunciation problems [18].

5.3. Implications for Future Research

There were several limitations of this study. First, using the attitudinal-scale questionnaire assumes students' pronunciation problems and thus cannot show students' real thoughts comprehensively. It also did not provide direct evidence for analyzing students' pronunciation problems. Second, this study was a preliminary synthesis and test of previous scholarly discussions on FL and pronunciation teaching. It could not include all the factors that influence FL, take enough sounds for analysis for the sake of minimal error, or examine each factor's effect on FL in depth. Third, the correlation between variables was not checked, and each FL factor was checked individually. The researcher could only make inductive arguments about interaction's effect on pronunciation learning or the relative importance of FL factors. Finally, the setting of the study was WKU, a Sino-Foreign collaborative university. The results of this study are primarily applicable to WKU and similar Chinese universities. To offer more accurate suggestions for teaching pronunciation, future research can either dig deeper into students' real opinions by interviewing students about their experience with

pronunciation mistakes or accurately explore students' pronunciation problems by directly analyzing the acoustic features of their sounds. It is also recommended that researchers find correlations between variables regarding natural interaction and pronunciation learning to determine which aspects of interaction are related to students' progress in pronunciation. Moreover, to get a more accurate and comprehensive picture of what influences FL, future studies can calculate and weigh different factors' effects on FL, or they can also investigate how FL is affected by interaction, sound position, pragmatics, etc. individually with depth and more phonemes as testing items.

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