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# INSTRUCTION TO OVERCOME THE DIFFICILTY IN ACQUIRING ENGLISH SEGMENTS NON EXISTENT IN KURDISH TO KURDISH EFL LEARNERS

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## ABSTRACT

**In every language, speakers usually have fixed numbers of sound-units which are combined together to form the words of the language. O'Connor (1980) describes this as having a number of fixed boxes for each sound, which we go to when we speak to form words. Every language has different numbers and arrangements of these boxes, which become stronger with time. As a result, when learners try to learn a new language which certainly has different numbers of boxes compared to their native language, they need to build up new boxes for the new sounds. Usually this is not a very easy thing to do unless they have enough exposure to the target language. So, when they find it difficult to build a new box, they replace these sounds with other sounds that are articulately closer to them. For example, they replace the sound with which are both voiceless fricatives and are very common in English. Dental fricatives in English are among the most mispronounced sounds by Kurdish EFL learners. Students will overcome this difficulty after instruction.**

**The problem with these sounds can either be a perception problem or a production problem. Concerning the velar nasal, learners cannot easily articulate the sound because their organs of speech are not used to make the movements that produce this sound. Besides, they cannot hear the sound easily and often confuse it with this combination /ng/. For this reason, they lack the skill of predicting its presence or absence in a word.**

**As for the dental fricatives they are inherently difficult for production and articulation, not only for learners but also for native speakers. The other difficulty of these sounds could be in their perception. Acoustically speaking, these sounds are perceptually weak and are easily confused with labio-dental fricatives /f/ or /v/ and can thus be perceptually ambiguous (Jekiel, 2012).**

**It is hypothesized that Kurdish EFL learners will also face difficulty with these sounds. This difficulty can be overcome with appropriate instruction. Ten participants, who have not received prior instruction in English phonetics and phonology, were chosen for the purpose of the analysis. They were asked to read (15) minimal pairs of each target sound contrasted with similar sounds in a pre-instruction test. They were later asked to read them again in a post-instruction test. After examining the production of these target sounds in both tests, it appears that the number of mispronunciation errors is reduced from (84 %) to (14%) of the data. This reduction in the number of errors is the result of the given instruction. It appears that providing instruction is valuable and efficient in overcoming this difficulty. The results are of value to the teachers who teach Phonetics and Phonology in the English departments. This also proves that teaching Phonetics and Phonology should not be underestimated.**

***KEY WORDS:*** Kurdish EFL Learners, Error Analysis, pronunciation, English dental fricatives.

## 1. INTRODUCTION

In this study, we aim to predict whether certain English sounds that do not exist in Kurdish are problematic for Kurdish EFL learners and find out how they substitute these sounds. Then we offer efficient instruction modes to overcome this difficulty. If we compare the consonants of both Kurdish and English, we can see that they are different. English has certain consonants that do not exist in Kurdish such as dental fricatives

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ƛ ⟼◯ ⇂ħ⊙ ⇁⊙ℓ⟼→ ◯⟼↵⟼ℓ

.˙ The two dental fricatives, which are denoted in the English alphabet by (th), differ in voicing. The dental fricatives are highly marked sounds since they are very rare in the world's languages and only occur in 43 (7.6%) out of the 566 languages surveyed (Maddieson, 2013).

These consonants are expected to be problematic for Kurdish EFL learners. When learners come across words in the target language that contain these sounds, they read these words based on their existing knowledge of the phonemes of their first language. So, they modify the production of certain words which contain phonemes that do not exist in their native language. This results in inaccurate pronunciation of foreign language sequences.

## 2. AIMS

This paper aims to achieve the following points:

**1.** Investigate the learning of dental fricatives ⟼◯ ƛ and the velar nasal .˙ which are non-existent in Kurdish by Kurdish EFL learners and to what extent they mispronounce these sounds.

**2.** Examine which sounds act as substitutes of the sounds ⟼◯ ƛ and .˙

**3.** Try methods of instruction to improve their performance in producing the target sounds, reduce their substitution and suggest pedagogical implications.

## 3. THE MODEL

The model that we followed here is Error Analysis (EA) which is adopted to analyze the errors students make when they pronounce the sounds ƛ ⟼◯ .˙ which are nonexistent in Kurdish. The systematic errors they make in their production reveal whether they have problems in this aspect or not. Then, the subjects receive instruction to show whether they have developed or not. When errors are examined they show the stage of development in the learner's language. Dulay, *et al*. (1982) affirm that errors could also be good indicators of the difficult parts of L2 which teachers need to pay attention to.

## 4. RELATED LITERATURE

The main purpose of teaching a language and specially pronunciation is to help students learn to communicate and avoid communication breakdown. In order to achieve this, pronunciation should be intelligible; that is clear enough to be heard and understood. What lays as the foundation for spoken communication is having the ability to pronounce segments correctly in the first place.

In English language there is no one to one correspondence between sounds and letters. The number of sounds (44) is far more then the number of letters (26). In Kurdish on the other hand there is a strong correspondence between sounds and letters. This is why Kurdish EFL learners face difficulty when acquiring the different sounds of English, especially those nonexistent in the Kurdish sound inventory, namely ƛ ⟼◯ .˙ .

In a contrastive analysis of English and Kurdish, Rahimpour & Dovaise (2011) notice that Kurdish EFL learners substitute /s/ or /t/ for English and /z/ or /d/ for English ƛ for example, pronouncing "then" as /den/ and /zen/ by most of the Kurdish students (also see Muhammadi (2014)).

Speakers of other languages, who try to learn English, face the same problem. In a study that investigated the sound production of EFL Indonesian teacher students by Arief & Hamidiyah, they observed these teacher students in practice and found that they were very challenged with the production of certain English consonant sounds such as ƛ ⇁ ◁ and ≻ and replaced them with sounds from their own language /d/, /t/, /p/, /s/ and /p/ respectively.

Metruk (2017) examines the degree of difficulty in pronouncing English dental fricatives by Slovak EFL learners. He found that they were mispronounced to a substantial degree. Consonants /t/ and /f/ acted as substitutes for /θ/, while consonants /d/and /t/ were used as a replacement for

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/ð/. He asserts the importance of focusing on proper pronunciation instruction as part of the curriculum to overcome this difficulty.

Osborne (2008) investigates the interlanguage of a Brazilian Portuguese learner of English. He found that she replaces dental fricatives with /t/ and /d/ systematically through all her speech since these sounds are not part of her phoneme inventory. This leads to confusion and lack of intelligibility in certain replacement occasions (e.g., thanks ⋱⋰⋱ ← and tanks ↔⋱⋰⋱ ←).

Karakas (2011) points out that Turkish EFL learners and teachers also face difficulty with the dental fricatives ↦◆○ ƛ due to their non-existence in the Turkish sound inventory. So, they replace these sounds with /t/ and /d/ respectively.

**t**aught ↔ ⁄↔ vs. **th**ought ⁄↔

**d**ose ○𝕃∪z vs. **th**ose 𝕃∪z

He therefore suggests that these sounds should be given special attention and provides a lesson plan that teachers can follow to overcome fossilization of these errors.

Nizamuddin (2015) shows that the fricatives of English /f , v , θ, ð z, ʒ/ do not exist in Hindi. So, they are difficult for acquisition. Some speakers of English in India are able to articulate the phonemes /f/, /v/, /z/ and /ʒ/ in their spoken English. This may be due to the fact that these sounds can be found in languages like Urdu, Arabic and Panjabi which are also spoken in India. So, the speakers might have acquired these sounds from these languages. Whereas, dentals /θ, ð/ of English are among the most difficult sounds for them and hence they are missing from Indian English and are replaced with dental plosives.

Many other EFL language learners face the same problem because of the lack of these target sounds in their sound inventory; such as Buginese, which is a language spoken in Indonesia (Nurpahmi, 2013).

Jesney (2005) describes the same problem with French ESL learners. She states that the replacement of target language sounds, especially the marked ones which are uncommon, is systematic and very common among many French EFL learners. The most preferred and common substitutes are /s, z/ and /t, d/.

Morrison (2005) also mentions that these French ESL speakers tend to substitute dental fricatives with dental stops. The nature of substitution differs from Canadian-French speakers, who substitute them with dental stops /t/ and /d/, to European-French speakers, who substitute them with /s/ and /z/. The difference, according to Morrison (ibid), is due to the fact that European–French /s/ tends to be dental; Canadian–French /s/ is alveolar. For Canadians the dental plosive is the closest L1 sound to the English dental fricative, but for Europeans the strident dental fricative is the closest.

The French language, which is regarded as the source of Cajun variety of English spoken by people of Acadian descent in southern Louisiana, has also affected this variety to the extent that they replace the dental fricatives with /t/ and /d/ in all English words containing these sounds. So, they say ‘dis’ and ‘tink’ instead of ‘this’ and ‘think’ (Dubois & Horvath, 1999).

Wester, *et al*. (2007) state that although Dutch learners have a high level of English, few of them produce target-like production of dental fricatives. They also substitute dental fricatives.

After reviewing the related literature, the frequency of the difficulty in the pronunciation of the target sounds becomes obvious. Research in this area with reference to Kurdish EFL learners has not been investigated so far. This calls for the necessity of conducting a similar research investigating the difficulty of pronouncing the target sounds by Kurdish EFL learners.

## 5. PROCESS

- **Stimuli (Target words)**

A list of example pairs that include the target sounds were contrasted with sounds that may act as their substitutes (see Appendix A). was contrasted with ← . ƛ was contrasted with . ⋰ was contrasted with ◆ .

The following are example pairs:

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thin ⋂ sin ⌟⋂

bathe /↕⊙⋂ƛ bays ↕⊙⋂

ping ≺⋂.˙˙ pin /≺⋂

▪ **Subjects**

The subjects were (25) Kurdish EFL students from Duhok university/ college of Humanities/ English department/ 1st stage (2016-2017), who have not received instruction in English Phonetics and Phonology as an independent topic in their syllabus.

▪ **Procedures**

It contains a twofold production task. The first task is reading the list of pairs chosen for the purpose of the study before instruction. The second one includes reading the same list after instruction. The purpose of these tasks is to reveal the level progress and the effectiveness of instruction. The readings are recorded on a PC. The recordings are transcribed phonemically using IPA.

▪ **Instruction**

In order to realize the target dental fricatives ƛ ⟼○ correctly, learners need to approach their tongue tip towards the upper teeth in a way that allows air to escape through them as Roach (2009) suggested. Concerning the velar nasal .˙˙ , the back of the tongue approaches the velum making a velar closure and allowing the air to escape from the nose. The articulatory movements needed for the production of these sounds are difficult for second language learners since their articulators are not familiar with these movements.

This means that learners try to add new sounds to their existing schemata in a process called accretion as Celce, *et al.* (1996) suggested. The teaching stages which should be followed in order to introduce new sounds as proposed by them are as follows:

**a. Analysis and consciousness raising:**

The diagnosis of the problem is based on typical errors by learners depending on a test on the area of difficulty. The first step of teaching, adopted by the researchers, begins with the description of target sounds as being major phonemes in English. This is done by giving a presentation on the features of these sounds and how they are articulated by the vocal organs, including reference to their place and manner of articulation and their voicing states.

**b. Listening discrimination:**

This is done through providing maximum exposure to these target sounds through focused listening practice activities such as audios of minimal pairs from O'Connor (1980), word choice, educational videos of a specialist instructing how the sounds are produced by exemplifying the sounds, and asking them to circle the target sounds in sentences in a listening activity.

Tuan (2010) asserts that minimal pair drills have a very high pedagogical effectiveness when employed as a teaching tool for phoneme discrimination. They create an environment in which sounds are contrasted and perceived with ease which facilitates the acquisition of discrete sounds. This also creates awareness on the importance of being accurate in pronunciation in order to avoid misperception or confusion on the part of the listener.

**c. Production:**

This is achieved by providing ample opportunities for students to produce the target sounds through guided reading practice activities accompanied by constant feedback on the part of the researchers. These activities included reading minimal pairs, short dialogues and even communicative practice activities that elicit the use of words that contain these sounds like creating a communicative situation where students are divided into pairs and are handed a collage of pictures of items with the target sounds. Students are assigned the roles of seller-customer to use the target sounds in their dialogues (Celce, *et al.*, 1996)

## 6. DISCUSSION

After analyzing the results of the pre_instruction test, a total of 10 participants (100%) mispronounced (378) out of (450) of the target consonants /θ/, /ð/ and .˙˙ which make up (84%) of their data.

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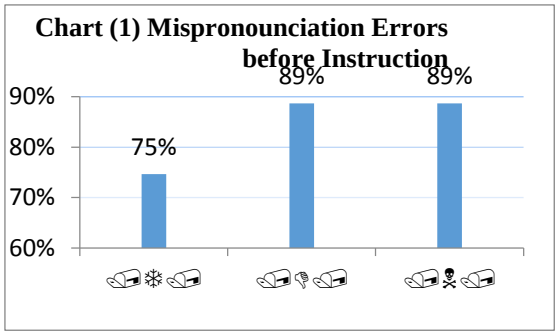
Subjects produced (112) mispronunciations of /θ/ out of (150) words, which makes up (75 %) of the data. They also produced (133) mispronunciations for each of /ð/ and ظ which each make up (89%) of their data as shown in table and chart (1).

**Table (1) :-**Mispronunciation Errors before Instruction

| | ظ | ظ |
|---|---|---|
| 75% | 89% | 89% |
| **Total Errors** | 378 | **84%** |




The results of the post instruction test have shown significant changes. After instruction subjects scored lower levels of error. Participants produced (61) mispronunciation errors which make up only (14 %) of the data.

Subjects produced only (6) mispronunciations of /θ/ out of (150) words, which make up (4 %) of the data. They also produced (30) mispronunciations of /ð/ which make up (20 %) of their data. They also produced (25) mispronunciation of ظ which make up (17 %) of their data as shown in table and chart (2)

**Table (2)-:** Mispronunciation Errors after Instruction

| | ظ | ظ |
|---|---|---|
| 4% | 20% | 17% |
| **Total Errors** | 61 | **14%** |

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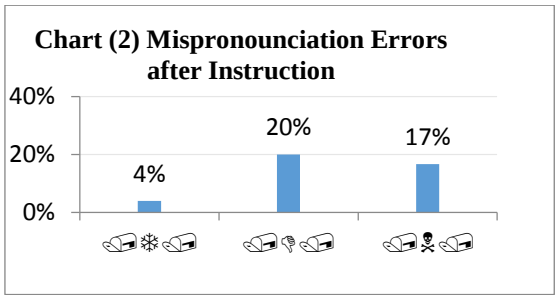
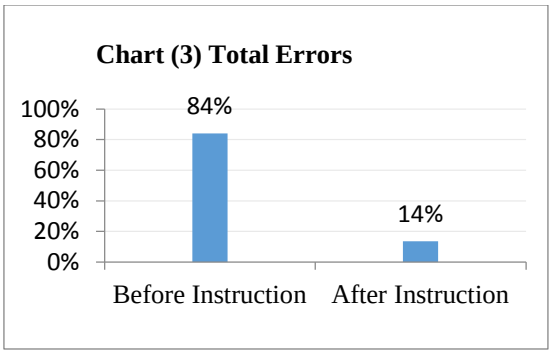



A comparison of both test results shows the significance of instruction in reducing error numbers in their production as clearly shown in table and chart (3).

**Table (3):-** Total Errors

| Before Instruction | After Instruction |
|---|---|
| 378 | 61 |
| **84%** | **14%** |




Concerning the target sounds substitutes, participants exhibited a particular pattern regarding the substitutes of the target sounds. Substitutes of along with their percentages are shown in table and chart (4) bellow:

**Table (4)** : - substitutes

| /t/ | /s/ | /d/ | ʎ |
|---|---|---|---|
| 75% | 21% | 2% | 2% |

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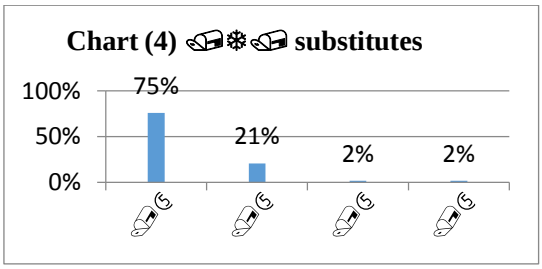


(76 %) of the mispronunciation errors were the ones in which was substituted for /t/ such as S2's output in example (1):

(1) S2's output:

| **Lexical item** | **Output** | **Target Pronunciation** |
|---|---|---|
| think | | |
| path | | |

(21 %) of the mispronunciation errors were the ones in which was substituted for /s/ such as example (2):

(2) S5's output:

| **Lexical item** | **Output** | **TP** |
|---|---|---|
| thank | | |
| math | | |

was also substituted by /d/ and in a few instances such as in examples (3) and (4):

(3) S9's output:

| **Lexical item** | **Output** | **TP** |
|---|---|---|
| thin | | |

(4) S7's output:

| **Lexical item** | **Output** | **TP** |
|---|---|---|
| thin | | |

The substitutes of the sound with their occurrence percentages are shown in table and chart (5) bellow:

**Table (5):-** substitutes

| /t/ | /s/ | | /d/ | /z/ | /m/ |
|---|---|---|---|---|---|
| 50% | 25% | 17% | 4% | 3% | 1% |

Some of these errors, like substituting / by are may be due to slips of the tongue.

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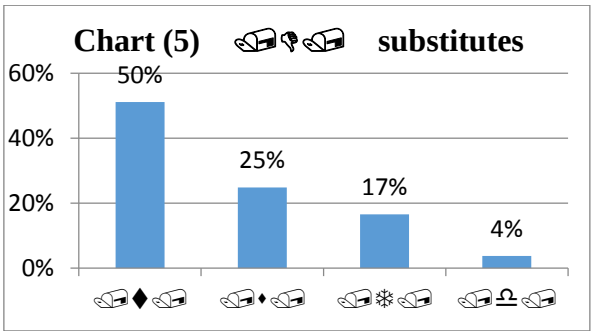


A prevalence of the errors in pronouncing the voiced dental fricative ƛ as /t/ occurred at (50 %) of the errors, which are exemplified in the following participant performance:

(5) S8's output:

| **Lexical item** | **Output** | **TP** |
|---|---|---|
| breathing | ↕→◌/↔⋂.ˑˑ | |
| | ↕→◌/ƛ⋂.ˑˑ | |
| ←◌↔ħ | ←⋂↔ | ←⋂ƛ |

Examples of /s/ and as substitutes of ƛ were also marked in the participant's performance to a certain degree, such as examples (6) and (7):

(6) S6's output:

| **Lexical item** | **Output** | **TP** |
|---|---|---|
| though | ←𝕃⋃ | ƛ𝕃⋃ |
| ↔⊙⊙↔ħ⊙ | ↔◌/← | |
| | ↔◌/ƛ | |

(7) S9's output:

| **Lexical item** | **Output** | **TP** |
|---|---|---|
| soothe | ←◌/ | ←_/ƛ |
| though | _/ | ƛ𝕃⋃ |

The voiced dental fricative ƛ was also identified as /d/or /z/ to a lesser degree in words such as in examples (8) and (9):

(8) S4's output:

| **Lexical item** | **Output** | **TP** |
|---|---|---|
| then | ○ ◆ | ƛ ◆ |
| breath | brɜz/ | ↕→i:ƛ |

(9) S6's output:

| **Lexical item** | **Output** | **TP** |
|---|---|---|
| ←◌↔ħ | ←⋂ | ←⋂ƛ |
| Bathe | /↕ˑ.ˑ | ↕⊙⋂ƛ |

The velar nasal .ˑˑ was also substituted with different sounds which are shown in table and chart (6) accompanied with their occurrence percentages:

**Table (6):-** .ˑˑ substitutes

| .ˑˑ• | .ˑˑ | ◆ | ◆↔◁ | ↔ | .ˑˑ↔ | ˑ˙. |
|---|---|---|---|---|---|---|
| 49% | 34% | 7% | 3% | 2% | 2% | 1% | 1% | 1% |

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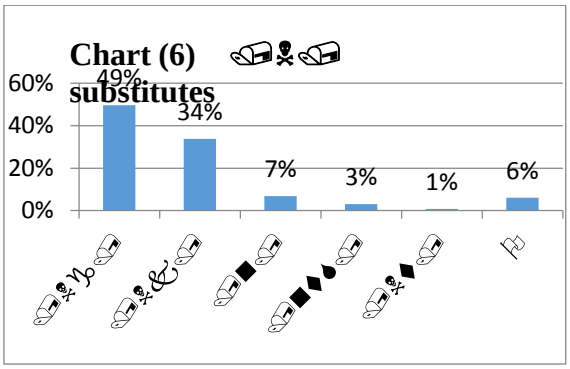


Half of the mispronunciations of the velar nasal were mostly pronounced with a final velar stop/g/ in words such as in example (10):

(10) S6's output:

| **Lexical item** | **Output** | **TP** |
|---|---|---|
| ⟝◆ | ⟵̄.ˑˑ• | ⟵̄.ˑˑ |
| Hanged | ħ.ˑˑ•○ | ħ.ˑˑ○ |

The velar nasal was also pronounced with a final voiceless velar stop /k/ in (34 %) of the errors:

(11) S10's output:

| **Lexical item** | **Output** | **TP** |
|---|---|---|
| Sing | ↵⋂.ˑˑ | ↵⋂.ˑˑ |
| king | ⋂.ˑˑ | ⋂.ˑˑ |

Other substitutes of the velar nasal, which are shown in table and chart (6) are exemplified bellow:

(12) S1's output:

| **Lexical item** | **Output** | **TP** |
|---|---|---|

Some of the participants used the strategy of avoidance when they faced difficulty in producing the velar nasal .ˑˑ For example, S1 and S7 avoided pronouncing the target sound .ˑˑ in their outputs as in examples (15) and (16):

(15) S1's output:

| **Lexical item** | **Output** | **TP** |
|---|---|---|
| tongue | ↔≙/ | ↔⁻.ˑˑ |

(16) S7's output:

| | | |
|---|---|---|
| hanged | ħ.ˑ◆⋂○ | |
| | ħ.ˑˑ○ | |

(13) S2's output:

| **Lexical item** | **Output** | **TP** |
|---|---|---|
| ponged | ≺↦⋃◆↔◁ | |
| | ≺⇄.ˑˑ○ | |
| hanged | ħ.ˑ◆↔◁⋂↦ | ħ.ˑˑ○ |

(14) S7's output (which is the only occurrence) :

| **Lexical item** | **Output** | **TP** |
|---|---|---|
| king | ⋂.ˑˑ↔ | ⋂.ˑˑ |

| **Lexical item** | **Output** | **TP** |
|---|---|---|
| tongue | ↔↦⋃ | ↔⁻.ˑˑ |

## 7. CONCLUSIONS

This research has come up with the following conclusions:

- The participants faced difficulty in pronouncing ƛ ↦◆○ .ˑˑ due to their non-existence in their mother tongue language, Kurdish. This was clear through the high percentage of

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mispronouncing errors they made in the pre-test reading which represent (84 %) of the data. This high percentage shows the seriousness of the matter in question.

- The results showed the necessity of providing appropriate guidance for the correct pronunciation of the target sounds.
- The participants replaced the three sounds with different substitutes. The most common substitutes of both ⟼◯ /ƛ/ were the sounds /t/ and /s/, rated (75%) and (50%) respectively. These substitutions may be caused by the participants' lack of ability to differentiate between the two readings of the (th) combination. As for the sound /.˙/, it was mostly mispronounced as /.˙•/ which is (49%) of the /.˙/ substitutes.
- The instruction was helpful in reducing the number of errors to (14 %), which were clear in the results of the post test. The reduction of errors to this small rate shows the success of the research aim.
- The research also has important pedagogical implications for pronunciation teachers. The effectiveness of instruction conducted in the research shows the importance of teaching pronunciation lessons to Kurdish EFL learners. Appropriate instruction helps to overcome the pronunciation difficulties that learners face. Teaching Phonetics and Phonology as part of the curriculum is essential.

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## 1. Appendix A

Minimal Pairs of Target Sounds Contrasted with Similar Sounds

| ↦◯ ← | | ƛ ↦◯ | | ◯ ↦◯ .˙ | |
|---|---|---|---|---|---|
| thing | sing | then | Zen | thin | thing |
| thick | sick | though | zoo | sin | sing |
| think | sink | breathing | breezing | sun | sung |
| thin | sin | clothing | closing | win | wing |
| thumb | some | teething | teezing | bun | bung |
| thimble | symbol | clothe | close | pin | ping |
| thank | sank | teethe | teeze | chin | ching |
| things | sings | breathe | breeze | stun | stung |
| mouth | mouse | bathe | bays | kin | king |
| faith | face | with | whizz | ton | tongue |
| tenth | tense | soothe | sues | ban | banged |
| math | mass | loathe | lows | hand | hanged |
| myth | miss | seethe | sees | wind | winged |
| path | pass | lathe | laze | pond | ponged |
| fourth | force | tithe | ties | banned | banged |

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## Appendix B

Transcriptions of Subjects' Outputs of Target Sounds before and after Instruction

**Student (1)** **Before Instruction**

| | | | | | |
|---|---|---|---|---|---|
| tɪŋk | sɪŋk | ○ɜ□ | ɜ□ | ↔ɪn | ↔ɪŋk |
| teɪk | sɪk | ↔ɔ:t | ɔ: | ←ɪn | ←ɪŋk |
| tɪŋk | sɪŋk | ↕→○:tɪŋk | ↕→○:zɪŋg | ←ʌn | sʌŋk |
| tɜn | sɜn | ℓɔ:tɪŋk | ℓɔ:sɪŋk | ⌐ɜn | ⌐ɪŋ |
| tɑ:mp | sɑ:mp | ↔aɪtɪŋk | ↔⊙ɪsɪŋk | ↕ʌn | ↕ʌŋg |
| tɜmbɪl | sɜmbɪl | lɑʊt | lɔ:z | ≺ɪn | pɪŋg |
| tæ.·ˈk | sæ.·ˈk | ↔ɑɪt | ↔ɑɪs | sʌn | sʌŋk |
| tɪŋg | sʌ.·ˈks | ↕→ɜ↔ | ↕→ɜ | stʌn | stʌŋk |
| meʊt | mɑʊs | ↕⊙ɪt | ↕⊙ɪs | ɪn | ɪŋg |
| feɪt | feɪs | ⌐ɪð | ⌐ɪz | tɒn | tɑ:k |
| ↔ɜ□↔ | ↔ɜ□← | ←ɑʊt | sʊɪs | bænd | bænɪd |
| ∓ʌt | ∓ʌs | lɑʊt | lɑʊs | hænd | hænɪd |
| ∓⊙⋂t | ∓ɪs | seɪt | seɪz | ⌐ɪnd | ⌐ɪnɪd |
| ≺ɑ:t | ≺ɑ:s | lʌt | l⊙ɪz | ≺ɒnd | ≺ʌŋd |
| ≻ɔ:rt | ≻ɔ:rtʃ | ↔⊙ɪt | ↔⊙ɪs | bænd | ↕ɜŋd |

**After Instruction**

| | | | | | |
|---|---|---|---|---|---|
| ○… | ←○… | fi↙□ | ↙□ | ↔⊙□ | ↔⋂… |
| ○ | ←○ | fi ↔ | _ | ←⋂□ | ←⋂… |
| Š○… | ←○… | ↕→↙fi○ … | ↕→↙ ○ … | ← □ | ← … |
| Š↙□ | ←↙□ | ℓ fi ○… | ℓ_ ←○ … | ⌐⋂□ | ⌐⋂… |
| Š ∓ | ← ∓ | ↔⊙⋂fi○ … | ↔⊙⋂⌐⋂ … | ↕ □ | ↕ … |
| Š↙∓↕○ℓ | ←↙∓↕○ ℓ | ℓ Š | ℓ□ ← | ≺⊙⋂□ | ≺⊙⋂… |
| Š·.· .·ˈ | ← .·ˈ | ↔⊙⋂fi | ↔⊙⋂← | ↔⇌⊙○ □ | ↔⇌⊙○… |
| Š○…•← | ←○…•← | ↕→↙fi | ↕→↙ | ↔ □ | ↔ … |
| ∓·.· Š | ∓·.· ← | ↕⊙⋂fi | ↕⊙⋂ | ⊙⋂□ | ⋂… |
| ≻⊙○Š | ≻⊙○← | ⌐⋂fi | ⌐⋂ | ↔∡□ | ↔∡…• |
| ↔↗□Š | ↔↗□← | ← fi | ←↦⋂ | ↑ □○ | ↑ …○ |

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**Student (2)** **Before Instruction** **After Instruction**

| | | | | | |
|---|---|---|---|---|---|
| ↵⋂ŋk | ⌟⋂ŋk | ○ɜn | ɜn | ○ɜn | ↵⋂.˙˙ |
| ↵⋂ | ⌟⋂ | ↵↦ʊt | uː | ←⊙⋂◆ | ⌟⋂.˙˙ |
| θɪŋk | ⌟⋂ŋ | ↕→iːθɪŋ | ↕→iːzɪŋ | ←ʊn | ↵↦ʊ◆ |
| ○ɜ◆ | ←ɜ◆ | ℓuːtɪŋ | ℓuːsɪŋ | ⌟⋂◆ | ⌟⋂.˙˙• |
| ↵ʌmp | ←ʌmp | ↵iːθɪŋ | ↵iːsɪŋ | ↕ɒn | bɒ.˙˙• |
| ↵ɑːmpɪl | ←ɜmpɪl | ℓəʊt | ℓəʊs | ≺ɜ◆ | ≺ɜ.˙˙ |
| ↵æ.˙˙k | ←æ.˙˙k | ○ɜt | ○ɜs | tʃeɪn | tʃʌ.˙˙ |
| ↵⋂ŋks | ⌟⋂ŋks | ↕→ɜt | ↕→ɜs | ←→æn | ←→æ.˙˙ |
| ∓↦ʊt | ∓↦ʊs | ↕ɑːt | ↕⊙⋂← | ⋂◆ | ⋂.˙˙ |
| feɪt | ≻⊙ɪs | ⌟⋂↵ | ⌟⋂ ⋂ | ↵↦ʊn | ↵↦ʊk |
| ↵ɜnt | ↵ɜns | ←aʊt | ↵↦ʊz | ≺æn | ≺æntʃɪt |
| ∓æt | ∓æs | ℓ↦ʊt | ℓ↦ʊz | ħænd | ħæntʃɪt |
| ∓⊙⋂↵ | ∓⋂← | ←iːd | ←iːz | ⌟⋂◆○ | ⌟⋂.˙˙ |
| ≺æt | ≺æs | ℓɑːt | ℓɑːz | ≺↦ʊnd | ≺↦ʊntʃ |
| ≻↦ʊrt | ≻↦ʊrs | ○ɜt | ○ɜz | ≺⋂◆○ | ≺⋂◆tʃ |

| | | | | | |
|---|---|---|---|---|---|
| θɪ.˙˙ | ⌟⋂.˙˙ | ðɜn | ɜn | ðɜn | θɪ.˙ |
| θeɪk | ←⊙⋂ | ↵uː | zuː | ⌟⋂◆ | ⌟⋂. |
| θɪ.˙˙ | ⌟⋂.˙˙ | ↕→iːðɪ.˙˙ | ↕→iːzɪ.˙˙ | ←ʌn | ⌟ʌ.˙ |
| ðɜn | ɜ◆ | ℓuːðɪ.˙˙ | ℓuːzɪ.˙˙ | ⌟⋂◆ | ⌟⋂. |
| θʌmp | ←ʌm | ↵iːtɪ.˙˙ | ↵iːsɪ.˙˙ | ↕ɒn | ↕ɒ. |
| θɜmpɪl | sɜmpɪl | ℓuːt | ℓuːs | ≺⋂◆ | ≺⋂. |
| θæ.˙˙k | ←æ.˙˙k | ↵iːt | ↵iːs | tʃɪn | tʃɪ.˙ |
| θɪ.˙˙•← | ⌟⋂.˙˙•← | ↕→iːð | ↕→iːz | ←→ʌn | ←→ʌ. |
| ∓↦ʊθ | ∓↦ʊs | ↕æθ | ↕⊙⋂ | ɪn | ɪ.˙ |
| ≻⊙⋂θ | ≻⊙⋂← | ⌟⋂↵ | ⌟⋂ | ↵ʌn | ↵ʌ.˙ |
| θɜnθ | ↵ɜns | ←uːt | ←uːz | ↕ɑːnd | ↕ɑː.˙ |
| ∓æθ | ∓æs | ℓuːð | ℓuːz | ħænd | ħæ.˙˙• |
| ∓⊙⋂θ | ∓iː← | ←iːt | ←iːz | ⌟⋂◆○ | ⌟⋂.˙ |

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**Student (3)** **Before Instruction**

| | ← | ƛ | | ◆ | ˙·˙ |
|---|---|---|---|---|---|
| θɪ.˙ | sɪ.˙ | ↔ɜn | ɜn | ↔ɪn | θɪ.˙ |
| θɪk | ⌐⋂ | ↔ʊ•e | uː | ⌐⋂.˙ | ⌐⋂.˙ |
| ↔⋂.˙ | ⌐⋂◆ | ↕→ɜθɪ.˙ | ↕→ɜzɪ.˙ | ←ɒn | ←ʌ.˙ |
| ↔⋂.˙ | ⌐⋂◆ | ℓuːtɪ.˙ | ℓuːzɪ.˙ | ⌐⋂◆ | ⌐⋂.˙ |
| ↔ʌm | ←ʌm | ↔iːtɪ.˙• | ↔iːsɪ.˙• | ↕ʌn | ↕ʌ.˙• |
| ↔ɜmbɪl | ←ɜmbɪl | ℓuːθ | ℓuːzɪs | ≺⋂◆ | ≺⋂.˙• |
| ↔æ.˙k | ←æ.˙k | ↔iːs | ↔ɜs | tʃɪn | tʃɪ.˙• |
| ↔⋂.˙•ɪs | ⌐⋂.˙•ɪs | ↕→ɜs | ↕→eɪs | ←ɪ↔ʊn | ↔↔ɜ.˙ |
| ∓⊢→ʊθ | ∓⊢→ʊs | ↕⋂← | ↕⊙⋂← | ⋂.˙ | ʌ.˙ |
| ≻⊙⋂θ | ≻ʌs | ⌐⋂θ | ⌐⋂ | ↔ɒn | ↔ɒk |
| ↔ɜns | ←ɜns | ←uːθ | ←⊢→ʊz | ↕æ.˙• | ↕æ.˙•⋂○ |
| ∓ɑːs | ∓ɑːs | ℓ⊢→ʊs | ℓ⊢→ʊs | ħænd | ħæ◆gɪd |
| ∓ʌθ | ∓⋂← | ←iːs | ←ɑːs | ⌐⋂◆○ | ⌐⋂.˙•⋂○ |
| ≺ɑːs | ≺ɑːs | ℓ⊢⋂← | ℓ⊢⋂ | ≺ɒnd | ≺ɒ.˙ɪd |
| ≻ɔːrs | ≻ɔːrɪs | ↔iːs | ðiːs | ↕ænɪd | ↕æ.˙•⋂○ |

**After Instruction**

| | ← | ƛ | | ◆ | ˙·˙ |
|---|---|---|---|---|---|
| θɪ.˙ | sɪ.˙ | ðɜn | ɜn | θɪn | θɪ.˙ |
| θɪk | ⌐⋂ | ðuː | uː | ⌐⋂◆ | ⌐⋂.˙ |
| θɪn | θɪ.˙• | briːðɪ.˙ | briːðɪ.˙ | ←ʌn | ⌐⋂.˙ |
| θɪn | sɪn | klɔːðɪ.˙ | klɔːzɪ.˙ | ⌐⋂◆ | ⌐⋂.˙ |
| θʌm | sʌm | teɪðɪ.˙ | teɪðɪ.˙ | bʌn | bʌ.˙ |
| θɪmbɪl | sɪmbɪl | klɔːð | klɔːz | ≺⋂◆ | ≺⋂.˙ |
| θæ.˙k | ←ʌ.˙k | taɪð | taɪ← | tʃɪn | tʃɪ.˙ |
| θɪ.˙ | ⌐⋂.˙•⋂← | briːθ | briːs | ↔ʌn | ↔ʌ.˙ |
| ∓ɑʊθ | ∓ɑʊs | baːθ | ↕⊙⋂← | ⋂◆ | ⋂.˙ |
| ≻⊙⋂θ | ≻⊙⋂← | wɪθ | wɪz | ↔ʌn | tʌ.˙ |
| ↔ɜnɪθ | ↔ɜnɪs | suːð | suːz | ↕ʌn | nʌ.˙•⋂○ |
| ∓ɑːθ | mɑːs | lɑʊð | luːz | ħænd | ħæ.˙•⋂○ |
| mɪθ | ∓⋂← | siːð | ←iːs | ⌐⋂◆○ | ⌐⋂.˙○ |

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**Student (4)** **Before Instruction** **After Instruction**

| | ← | ƛ | | ◆ | .ˑˑ |
|---|---|---|---|---|---|
| tɪ.ˑˑ | sɪ.ˑˑ | ◯ɜn | zɜn | tɪn | tɪ.ˑˑ• |
| ↔ɪk | ←ɪk | ↔uː | uː | sɪn | sɪ.ˑˑ• |
| tɪ.ˑˑ | sɪ.ˑˑ | ↕→iːtɪ.ˑˑ | ↕→iːzɪ.ˑˑ | sʊn | sʊ.ˑˑ• |
| ↔⋂.ˑˑ | ←⋂◆ | luːtɪ.ˑˑ | luːzɪ.ˑˑ | ⌐⋂◆ | ⌐⋂.ˑˑ• |
| ↔ɒmb | sɒm | ↔iːtɪ.ˑˑ | ↔iːzɪ.ˑˑ | bɒn | bɒ.ˑˑ• |
| ↔ɜmp | ←ɜmp | kluːt | kluːz | ≺⋂◆ | ≺⋂.ˑˑ• |
| tɪ.ˑˑ | sɪ.ˑˑ | tiːt | tiːz | t∫⋂◆ | t∫⋂.ˑˑ• |
| tɪ.ˑˑ ← | sɪ.ˑˑ ← | briːt | ↕→⋂ | stɒn | stɒ.ˑˑ• |
| maʊt | maʊs | briːð | ↕ɒɪz | ⋂◆ | ⋂.ˑˑ• |
| ≻ɪt | ≻⊙⋂← | ⌐⋂↔ | ⌐⋂ | tɒn | tɒ.ˑˑ• |
| tɜnt | tɜns | ←ʌm | suːz | bɔːnd | bɔː.ˑˑ◯ |
| ∓⋂↔ | ∓⊙⋂← | lɑʊt | lɑʊz | ħænd | hændɪ.ˑˑ• |
| ∓⋂↔ | ∓⋂← | ←æt | sæz | ⌐⋂◆◯ | ⌐⋂◆◯⋂.ˑˑ• |
| pæt | pæs | lɜt | lɜz | pɒnd | pɔɪndʃ⋂◯ |
| ≻→ɑʊt | ≻→⊙⋂← | ↔iːt | tiːz | ↕ænd | ↕ɑːrɪn |

| | ← | ƛ | | ◆ | .ˑˑ |
|---|---|---|---|---|---|
| θɪ.ˑˑ | sɪ.ˑˑ | ðɜn | zɜn | θɪn | θɪ.ˑˑ |
| θɪk | ⌐⋂ | ◯uː | zuː | ⌐⋂◆ | ⌐⋂.ˑˑ |
| θɪ.ˑˑ | sɪ.ˑˑ | ↕→iːðɪ.ˑˑ | ↕→iːzɪ.ˑˑ | sɒn | sɒ.ˑˑ |
| θ⋂◆ | ←⋂◆ | kluːðɪ.ˑˑ | kluːzɪ.ˑˑ | ⌐⋂◆ | ⌐⋂.ˑˑ |
| θɜm | ←ɜm | tiːðɪ.ˑˑ | tiːzɪ.ˑˑ | bɒn | bɒ.ˑˑ |
| θɜmbɪl | sɜmbɪl | kluːð | kluːz | ≺⋂◆ | ≺⋂.ˑˑ |
| θɑː.ˑˑ | sɑː.ˑˑ | tiːð | tiːz | tʃɪn | tʃɪ.ˑˑ |
| θɪ.ˑˑ← | sɪ.ˑˑ•← | briːð | briːz | stʊn | stʊ.ˑˑ |
| maʊθ | maʊs | bɪð | bɜz | ⋂◆ | ⋂.ˑˑ |
| fɪθ | fɪs | wɪð | ⌐⋂ | tɒn | tɒ.ˑˑ |
| tɜnθ | tɜns | suːð | suːz | bʌnd | bɪ.ˑˑ◯ |
| mɑːθ | ∓⋂← | luːð | luːz | hænd | ħæ.ˑˑ◯ |
| meɪθ | ∓⊙⋂← | siːð | siːz | ⌐⋂◆◯ | ⌐⋂.ˑˑ◯ |

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**Student (5)** **Before Instruction** **After Instruction**

| | ← | ƛ | | ◆ | ˙˙ |
|---|---|---|---|---|---|
| ⊥⋂˙˙ | ⊥⋂˙˙ | ðɜn | zɜn | ⊥⋂◆ | ⊥⋂˙˙•⋂⊢ |
| θɪk | sɪk | ⊢ɔː | zɔː | ⊥⋂◆ | ⊢ʌ˙˙• |
| θɪk | ⊥⋂˙˙ | ↕→ɜðɪ ˙˙ | ↕→ɜzɪ ˙˙ | ⊢ɒn | ⊢ɒ˙˙• |
| θɪn | sɪn | ℓɔːðɪ ˙˙ | ℓɔːzɪ ˙˙ | ⊥⋂◆ | ⊥⋂˙˙• |
| θɒm | ⊢ɒm | ↔iːsɪ˙˙ | ↔⊙⋂⊢ ⋂˙˙ | bɒn | bɒ˙˙• |
| ⊥⋂∓↕⋂ ℓ | ⊢⊙⋂∓ ↕⋂ℓ | ℓɔːs | ℓɔːs | ≺⋂◆ | ≺⋂˙˙• |
| ⊢æ˙˙k | ⊢ɑː˙˙k | ↔iːs | ↔⊙⋂⊢ | tʃ⋂◆ | tʃ◌˙˙• |
| θ⋂◆˙˙ •⋂⊢ | ⊥⋂◆˙˙ •⋂⊢ | ↕→ɜs | ↕→iːs | ⟷ɒn | ⟷ɒ˙˙• |
| ∓ɑʊs | ∓ɑʊs | ↕æs | ↕⊙⋂⊢ | ⋂◆ | ⋂˙˙• |
| fɑɪθ | fsɑɪ | ⊥⋂ð | ⊥⋂ | tnɒ | tɒ˙˙• |
| ↔ɜnθ | ↔ɜns | ⊢uːs | ⊢ʊɪz | ↕ɑːnd | ↕ɑː˙˙•○ |
| ∓ɑːs | ∓ɑːs | ℓʊɪs | lɑʊz | ħænd | hæ˙˙•○ |
| ∓⊙⋂⊢ | ∓⊙⋂⊢ | ⊢iːs | ⊢⊙⋂ | ⌐ɑɪ○ | ⊥⋂˙˙•○ |
| ≺ɑːs | ≺ɑːs | ℓɑɪs | ℓɑːs | ppnd | ≺ɔɪ˙˙ ↔ |
| ≻ɔːrɪθ | ≻ɔːrɪs | ↔iːðə | ↔iːz | ↕ɑːnd | ↕ɑː˙˙•↔ |

| | ← | ƛ | | ◆ | ˙˙ |
|---|---|---|---|---|---|
| θɪ˙˙ | ⊢ɪ˙˙ | ðɜn | zɜn | θɪn | θɪ˙˙ |
| θɪk | sɪk | ðuː | zuː | ⊥⋂◆ | ⊢ɪ˙˙ |
| θɪ˙˙ | sɪ˙˙ | brɜðɪ˙˙ | ↕→iːzɪ˙˙ | sʌn | sʌ˙˙ |
| θɪn | sɪn | klɔːðɪ˙˙ | klɔːzɪ˙˙ | ⊥⋂◆ | ⊥ɪ˙˙ |
| ðʌm | ⊢ʌm | tiːðɪ˙˙ | tiːzɪ˙˙ | ↕ɒn | bɒ˙˙ |
| θɜmbɪl | sɜmbɪl | klɔːð | klɔːz | ≺⋂◆ | ≺⋂˙˙ |
| θæ˙˙ | ⊢æ˙˙ | tiːð | tziː | tʃɪ◆ | tʃɪ˙˙ |
| θɪ˙˙•⊢ | sɪ˙˙•⊢ | briːð | briːz | ⟷ɒn | stɒ˙˙ |
| mɑʊθ | mɑʊs | beɪð | beɪz | ⋂◆ | ⋂˙˙ |
| fɑɪθ | fɑɪs | wɪð | ⊥⋂ | tɒn | tɒ˙˙ |
| tɜnθ | tɜns | suːð | suːz | bɑːnd | bɑː˙˙○ |
| mɑːθ | ∓ɑːs | luːð | luːz | hænd | hæ˙˙○ |
| mɑɪθ | ⊥⋂ | siːð | siːz | ⋂◆◯ | ⋂˙˙◯ |

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**Student (6)** **Before Instruction**

| | ← | ƛ | | ◆ | ˙˙ |
|---|---|---|---|---|---|
| θɪ˙˙ | sɪ˙˙ | ðɜn | ɜn | ðɜn | θɪ˙˙ |
| θɪk | sɪk | ←əʊ | əʊ | ⌐⋂◆ | ⌐⋂˙˙• |
| θɪ˙˙ | sɪ˙˙ | ↕→iːθɪ˙˙ | ↕→iːzɪ˙˙ | ←ʌn | sʌ˙˙• |
| ðɜn | ⌐⋂◆ | ℓɔːðɪ˙˙ | ℓɔːzɪ˙˙ | ⌐ɑɪn | ⌐⋂˙˙• |
| tʌm | sʌm | ↔iːsɪ˙˙ | ↔iːsɪ˙˙ | ↕ʌn | bɒ˙˙• |
| ↔ɜmpɪl | ↔ɜmpɪl | ℓuːs | ℓuːs | ≺⋂◆ | ≺⋂˙˙• |
| θæ˙˙ | sæ˙˙ | ↔iːs | ↔iːs | tʃ⋂◆ | tʃ⋂˙˙• |
| θɪ˙˙ | sɪ˙˙ | ↕→iːs | ↕→iːz | ↔↔ʌn | ↔↔⋂˙˙• |
| ∓ɑʊs | ∓ɑʊs | ↕æz | ↕⊙⋂ | ⋂◆ | ⋂˙˙• |
| ≻⊙⋂← | ≻⊙⋂← | ⌐⋂ | ⌐⋂○ | ↔ʊn | ↔ʌ˙˙• |
| ðɜns | ↔ɜns | ←ɑʊs | ←uːs | ↕ænd | ↕ʊ˙˙○ |
| ∓ɑːs | ∓æs | ℓʌs | ℓɑʊs | ħænd | ħæ˙˙•○ |
| ∓ɑɪθ | ∓⋂← | ↵iːs | ←⊙⋂ | ⌐ɑɪn | ⌐⋂◆ |
| ≺æs | ≺æsɪs | ℓæ← | ℓʌz | ≺ɒ◆○ | ≺ɒ˙˙○ |
| ≻ɔːrs | ≻ɔːrs | ↔iːs | ↔iːs | ≺ænd | pæ˙˙○ |

**After Instruction**

| | ← | ƛ | | ◆ | ˙˙ |
|---|---|---|---|---|---|
| θɪ˙˙ | ↵ɪ˙˙ | ðɜn | zɜn | θɪn | θɪ˙˙ |
| θɪk | sɪk | ðuː | zuː | sɪn | sɪ˙˙ |
| θɪ˙˙ | sɪ˙˙ | briːðɪ˙˙ | briːzɪ˙˙ | sʌn | sʌ˙˙ |
| θɪn | sɪn | kluːðɪ˙˙ | kluːzɪ˙˙ | ⌐⋂◆ | wɪ˙˙ |
| θʌm | ⌐ʌm | tiːðɪ˙˙ | tiːzɪ˙˙ | ↕ʌn | bʌ˙˙ |
| θɪmbɪl | sɜmbɪl | kləʊð | kləʊz | ≺⋂◆ | pɪ˙˙ |
| θæ˙˙ | sæ˙˙ | tɜnð | tɜnz | tʃ⋂◆ | tʃɪ˙˙ |
| θɪ˙˙•← | sɪ˙˙•← | bræð | bræz | stʌn | stʌ˙˙ |
| mɑʊθ | mɑʊs | ↕⊙⋂ð | ↕⊙⋂ | ⋂◆ | kɪ˙˙ |
| feɪθ | ≻⊙⋂← | ⌐⋂ð | ⌐⋂ | tʌn | tʌ˙˙ |
| tɜnθ | tɜns | suːð | suːz | bænd | bæ˙˙○ |
| mæθ | mæs | luːð | luːz | hænd | hæ˙˙○ |
| mɪθ | mɪs | sɜð | sɜz | ⋂◆○ | wɪ˙˙○ |

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**Student (7)** **Before Instruction** **After Instruction**

| | ← | ƛ | | ◆ | ˙˙ |
|---|---|---|---|---|---|
| θɪ.˙ | sɪ.˙ | ðɜn | zɜn | ðɜn | θɪ.˙ |
| ↔⊙⋂ | ←⊙⋂ | tuː | zuː | sɜn | sɪ.˙ |
| tɪ.˙ | sɪ.˙ | briːð.˙ | briːzɪ.˙ | sʌn | sʌ.˙• |
| ◯ɜn | sɜn | kluːðɪ.˙ | kluːsɪ.˙ | ⌟⋂◆ | ⌟⋂.˙• |
| tɒmp | sɒm | tiːθɪ.˙ | tɜsɪ.˙ | bɒn | baʊ.˙• |
| tɜmbɪl | sɜmbɪl | kɒlθ | kluːs | ≺⋂◆ | ≺⋂.˙• |
| tæ.˙ | sɑː.˙ | teɪθ | ↔⊙⋂← | tʃɪn | tʃɪ.˙• |
| θɪ.˙•← | sɪ.˙•← | briːθ | briːz | stʌn | stʌ.˙• |
| maʊθ | maʊs | ↕əʊθ | ↕⊙⋂← | ⋂◆ | ⋂.˙↔ |
| ≻⊙⋂θ | ≻⊙⋂← | ⌟⋂ð | ⌟⊙⋂← | taʊn | taʊ.. |
| tɜnθ | tɜns | ←əʊθ | ←əʊz | baːnd | baʊθ |
| maːt | maːs | laʊθ | laʊs | haːnd | ħ⊙⋂↔ |
| maːθ | ∓⋂← | sɜθ | ←⊙⋂← | ⌟⋂◆◯ | ⌟⊙⋂↔ |
| paːt | paːs | laʊθ | laːs | paʊnd | paʊ.˙d |
| fɔːrθ | fɔːrs | ↔⊙⋂θ | tiːs | pænɪt | ≺ʌ.˙•↔ |

| | ← | ƛ | | ◆ | ˙˙ |
|---|---|---|---|---|---|
| θɪ.˙ | sɪ.˙ | ðɜn | zɜn | ðɪn | θɪ.˙ |
| θɪk | sɪk | ðuː | zuː | ⌟⋂◆ | sɪ.˙ |
| θɪ.˙ | sɪ.˙ | briːðɪ ˙˙ | briːzɪ.˙ | sʌn | sʌ.˙ |
| θɜn | sɜn | kluːðɪ ˙˙ | kluːzɪ ˙˙ | ⌟⋂◆ | wɪ.˙ |
| θʌm | sʌm | tiːðɪ.˙ | ↔⊙⋂⌟ɪ ˙˙ | bɒn | bɒ.˙ |
| θɜmbɪl | sɜmbɪl | kluːð | kluːz | ≺⋂◆ | pɪ.˙ |
| θæ.˙ | sæ.˙ | teɪð | ↔⊙⋂← | tʃɪn | tʃɪ.˙ |
| θɪ.˙← | sɪ.˙•← | ↕⊙⋂ð | ↕→⊙⋂ | stʌn | stʌ.˙ |

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**Student (8)** **Before Instruction** **After Instruction**

| | ← | ƛ | | ◆ | .˙˙ |
|---|---|---|---|---|---|
| tɪ.˙˙ | sɪ.˙˙ | dɜn | zɜn | ↔⋂◆ | ↔⋂.˙˙ |
| tɪk | sɪk | θɑʊ | zu: | ←⋂◆ | ←⋂.˙˙ |
| tɪ.˙˙ | sɪ.˙˙ | bri:tɪ.˙˙ | bri:zɪ.˙˙ | sʌn | ←ʌ.˙˙ |
| ↔⋂◆ | ←⋂◆ | klu:tɪ.˙˙ | klu:sɪ.˙˙ | ←⋂◆ | ←⋂.˙˙ |
| θʌmp | sʌm | ti:tɪ.˙˙ | ti:sɪ.˙˙ | bʌn | bʌ.˙˙ |
| sɜmpɪl | sɜmpɪl | klu:ts | klɒs | ≺⋂◆ | ≺⋂.˙˙ |
| tæ.˙˙ | sæ.˙˙ | ti:t | ti:s | tʃɪn | tʃɪ.˙˙ |
| θɪ.˙˙ ← | ←ɪ.˙˙ ← | ↕→⊙⋂↔ | ↕→⊙⋂← | stʊn | ↔↔ʊ.˙˙ |
| mɑʊt | mɑʊs | bɪt | ↕⊙⋂← | ⋂◆ | ⋂.˙˙ |
| ≻⊙⋂↔ | fɑ:s | ←⋂↔ | ←⋂ | tɒn | tʌ.˙˙ |
| ti:t | tɜns | sʊt | ←ʊz | bænd | bæ.˙˙•↔ |
| mæt | mæs | læt | lɑʊs | hænd | hæ.˙˙•↔ |
| ∓⊙⋂↔ | ∓⊙⋂← | ←⋂↔ | ←i:s | ≺⋂◆○ | ≺⋂.˙˙•↔ |
| pɑ:t | pɑ:s | lɜt | lɑ:s | pɒnd | pɒʊ.˙˙•⋂○ |
| fɔ:rt | fɔ:rs | ○⋂← | ti:s | ↕ænd | bæ.˙˙•⋂○ |

| | ← | ƛ | | ◆ | .˙˙ |
|---|---|---|---|---|---|
| θɪ.˙˙ | sɪ.˙˙ | ðɜn | zɜn | θɪn | θɪ.˙˙ |
| θɪk | ←⋂ | ðu: | zu: | ←⋂◆ | ←⋂.˙˙ |
| θæ.˙˙ | sɜ.˙˙ | bri:ðɪ .˙˙ | bri:zɪ.˙˙ | sʌn | sʌ.˙˙ |
| θɪn | ←⋂◆ | klu:ðɪ .˙˙ | klu:zɪ .˙˙ | wɪn | wɪ.˙˙ |
| θʌm | sʌm | ti:ðɪ.˙˙ | ↔i:sɪ.˙˙ | bʌn | bʌ.˙˙ |
| θæmbɪl | sæmbɪl | klu:ð | klu:z | ≺⋂◆ | ≺⋂.˙˙ |
| θæ.˙˙ | sæ.˙˙ | ti:ð | ti:z | tʃɪn | tʃɪ.˙˙ |
| θɪ.˙˙•← | ←⋂.˙˙• | bri:ð | bri:z | stʌn | stʌ.˙˙ |
| mɑʊθ | mɑʊs | beɪθ | beɪz | kɪ◆ | kɪ.˙˙ |

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**Student (9)** **Before Instruction** **After Instruction**

| | ← | ƛ | | ◆ | .˙˙ |
|---|---|---|---|---|---|
| θɪ.˙˙ | sɪ.˙˙ | ðɜn | zɜn | θɪn | θɪ.˙˙ |
| θɪk | sɪk | θuː | zuː | sɪn | sɪ.˙˙ |
| θɪ.˙˙ | sɪ.˙˙ | ↕→ɜðɪ.˙˙ | ↕→ɜzɪ.˙˙ | sʌn | sʌ.˙˙ |
| ðɪn | sɪn | klɑʊsɪ.˙˙ | klɑʊzɪ.˙˙ | wɪn | wɪ.˙˙ |
| θɑː.˙˙ | sɑː.˙˙ | tiːðɪ.˙˙ | tiːsɪ.˙˙ | bʌn | bʌ.˙˙ |
| θɜmbl | seɪmbl | klɑʊs | klɑʊs | pɪn | pɪ.˙˙ |
| θæ.˙˙ | sæ.˙˙ | tiːs | tɜs | tʃɪn | tʃɪ.˙˙ |
| θɪ.˙˙•← | sɪ.˙˙•← | brɜz | ↕→⊙⋂ | stɒn | stɒ.˙˙ |
| mɑʊθ | mɑʊs | bɑːs | ↕⊙⋂← | kɪn | kɪ.˙˙ |
| ≻⊙⋂← | ≻ɜs | ⌟⋂ð | wiːs | tɒn | tɒ.˙˙ |
| tɜns | tɜns | suːz | sɑʊz | bænd | bæ.˙˙•⋂○ |
| mæs | mæs | liːs | luːs | hænd | hæ.˙˙•⋂○ |
| ∓⊙⋂← | ∓⋂← | siːθ | ←⊙⋂ | wɪn | wɪ.˙˙•↔ |

| | ← | ƛ | | ◆ | .˙˙ |
|---|---|---|---|---|---|
| θɪ.˙˙ | ↵ɪ.˙˙ | ðɜn | zɜn | θɪn | θɪ.˙˙ |
| θɪk | sɪk | ðuː | zuː | ⌟⋂◆ | sʌ.˙˙ |
| θɪ.˙˙ | ↵ɪ.˙˙ | briːθɪ.˙˙ | briːzɪ.˙˙ | sʌn | sʌ.˙˙ |
| θɪn | sɪn | klɑʊðɪ.˙˙ | klɑʊzɪ.˙˙ | ⌟⋂◆ | ⌟⋂.˙˙ |
| θʌm | sʌm | tiːðɪ.˙˙ | tiːsɪ.˙˙ | bʌn | bʌ.˙˙ |
| θɜmbl | sɜmbl | klɑʊð | klɑʊs | pɪn | pɪ.˙˙ |
| θæ.˙˙ | sæ.˙˙ | tiːð | tiːs | tʃɪn | tʃɪ.˙˙ |
| θɪ.˙˙ | ↵ɪ.˙˙ | priːð | priːz | stʌn | stʌ.˙˙ |
| mɑʊθ | mɑʊs | pɜz | pɜs | kɪn | kɪ.˙˙ |
| fɑɪθ | fɜs | wɪs | wɪz | tɒn | tɒ.˙˙ |
| tiːnθ | tɜns | suːð | suːz | bænd | bæ.˙˙ |

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| | | | | | |
|---|---|---|---|---|---|
| mæθ | mæs | lɜθ | lɜz | pɒnd | pɒ.ˑˈ•↔ |
| fɔːrs | fɔːrs | tiːθ | tɜz | pænk | pæ.ˑˈ•↔ |

**Student (10)** **Before Instruction**

| | ← | ƛ | | ◆ | .ˑˈ |
|---|---|---|---|---|---|
| tɪ.ˑˈ | sɪ.ˑˈ | tɜn | sɜn | tɜn | tɪ.ˑˈ |
| taɪk | saɪk | taʊ | səʊs | sɪ◆ | sɪ.ˑˈ |
| tɪ.ˑˈ | sɪ.ˑˈ | briːtɪ.ˑˈ | briːzɪ.ˑˈ | sɒn | sɒ.ˑˈ |
| tɪn | sɪn | klaʊtɪ.ˑˈ | klaʊsɪ.ˑˈ | wɪ◆ | wɪ.ˑˈ |
| tʌm | ←ɒm | teɪtɪ.ˑˈ | teɪsɪ.ˑˈ | baʊn | baʊ.ˑˈ |
| tɜmpl | sɜmpl | klaʊt | klaʊs | pɜn | pɜ.ˑˈ |
| tæ.ˑˈ | sæ.ˑˈ | teɪt | teɪs | tʃɜn | tʃɜ.ˑˈ |
| tɪ.ˑˈ•← | sɪ.ˑˈ•← | breɪt | breɪs | stʌn | stʌ.ˑˈ |
| maʊt | maʊs | beɪt | beɪsɪs | kɪ◆ | kɪ.ˑˈ |
| faɪt | faːs | weɪt | beɪsɪs | tɒn | tɒ.ˑˈ |

**After Instruction**

| | ← | ƛ | | ◆ | .ˑˈ |
|---|---|---|---|---|---|
| θɪ.ˑˈ | ←ɹ.ˑˈ | ðɜn | zɜn | θɪ◆ | θɪ.ˑˈ |
| θænk | sænk | ðuː | zuː | sɪ◆ | sɪ.ˑˈ |
| θɪ.ˑˈ | ←ɹ.ˑˈ | brɒðɪ .ˑˈ | braʊzɪ .ˑˈ | sʌn | sʌ.ˑˈ |
| θɜn | sɜn | kluːðɪ .ˑˈ | kluːzɪ.ˑˈ | ⌐⋂◆ | ⌐Λ.ˑˈ |
| θɒm | sɒm | tæθɪ.ˑˈ | tæzɪ.ˑˈ• | baʊn | baʊ.ˑˈ |
| θɜmbl | sɜmbl | kləʊt | klaʊs | pɜn | pɪ.ˑˈ |
| θɪ.ˑˈ | ←ɹ.ˑˈ | teɪθ | teɪs | tʃɪn | tʃɪ.ˑˈ |
| θænks | sænks | braɪθ | braɪs | stʌn | stʌ.ˑˈ |
| maʊθ | maʊs | bæθ | bæz | kɪ◆ | kɪ.ˑˈ |

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| | | | | | |
|---|---|---|---|---|---|
| tɜnt | tɜns | saʊt | saʊz | bænd | bæ.ˑˈɪd |
| mæt | ∓⊙∩⊷ | laɪt | laʊs | hænd | hæ.ˑˈɪd |
| meɪt | meɪsɪs | seɪt | seɪs | wɪnd | weɪt |
| pæt | pæsɪs | leɪt | leɪs | pænd | pæ.ˑˈɪd |
| faʊrt | faʊrs | taɪt | taɪs | ↕→aɪən | bræ.ˑˈ |

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## Appendix C

**Test Results before Instruction**

| Subjects | Substitutes | | | | Substitutes | | | | | | Substitutes | | | | | | Errors | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | /t/ | /s/ | /d/ | | /t/ | /s/ | | /d/ | /z/ | /m/ | | | | | | | | | |
| **S1** | 15 | | | | 13 | | | 1 | | | 3 | 5 | 3 | | | | 15 | 14 | 11 |
| **S2** | 13 | | 1 | | 11 | | 2 | 2 | | | 2 | 4 | 1 | 4 | | | 14 | 15 | 11 |
| **S3** | 6 | 4 | | | 4 | 7 | 4 | | | | 7 | 3 | | | | | 10 | 15 | 10 |
| **S4** | 15 | | | | 12 | | | 1 | | 1 | 10 | | 4 | | | | 15 | 14 | 14 |
| **S5** | | 7 | | | | 10 | | | | | 14 | 1 | | | | | 7 | 10 | 15 |
| **S6** | 2 | 6 | | 1 | | 10 | 1 | | 2 | | 10 | 1 | 1 | | | | 9 | 13 | 12 |
| **S7** | 7 | | 1 | | 1 | | 10 | | | | 7 | 2 | | | 1 | 8 | 8 | 11 | 18 |
| **S8** | 12 | 1 | | | 12 | 1 | 1 | 1 | | | 5 | 8 | | | | | 13 | 15 | 13 |
| **S9** | | 5 | | 1 | | 5 | 4 | | 2 | | 5 | 10 | | | | | 6 | 11 | 15 |
| **S10** | 15 | | | | 15 | | | | | | 3 | 11 | | | | | 15 | 15 | 14 |
| **Totals** | 85 | 23 | 2 | 2 | 68 | 33 | 22 | 5 | 4 | 1 | 66 | 45 | 9 | 4 | 1 | 8 | 112 | 133 | 133 |
| | 75% | 21% | 2% | 2% | 50% | 25% | 17% | 4% | 3% | 1% | 49% | 34% | 7% | 3% | 1% | 6% | 75% | 89% | 89% |

| Total Errors | 378 |
|---|---|
| | **84%** |

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**Test Results after Instruction**

| Subjects | Substitutes | | | | Substitutes | | | | | | Substitutes | | | | | | Errors | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | /t/ | /s/ | /d/ | | /t/ | /s/ | /d/ | /z/ | /m/ | | | | | | | | | |
| **S1** | | | | | 1 | | | | | | 2 | 2 | | | | | 0 | 1 | 4 |
| **S2** | 1 | 1 | | | 1 | 9 | | | | | 1 | | | | | | 2 | 10 | 1 |
| **S3** | | | | | 4 | | | | | | 4 | | | | | | 0 | 4 | 4 |
| **S4** | | | | | | | | 1 | | | 1 | | 1 | | | | 0 | 1 | 2 |
| **S5** | 1 | | | | | | | | | | | | | | | | 1 | 0 | 0 |
| **S6** | | | | | | | | | | | | | | | | | 0 | 0 | 0 |
| **S7** | 1 | | | | | | | | | | | | | | | | 1 | 0 | 0 |
| **S8** | | 1 | | | 2 | | | | | | 2 | 3 | | | | | 1 | 2 | 5 |
| **S9** | | | 1 | | 1 | | 2 | | 1 | | | | | | | | 1 | 4 | 0 |
| **S10** | | | | | 5 | 3 | | | | | 4 | 5 | | | | | 0 | 8 | 9 |
| **Totals** | 3 | 2 | 1 | 0 | 14 | 12 | 2 | 1 | 1 | 0 | 14 | 10 | 1 | 0 | 0 | 0 | 6 | 30 | 25 |
| | 50% | 33% | 17% | 0% | 47% | 40% | 7% | 3% | 3% | 0% | 56% | 40% | 4% | 0% | 0% | 0% | 4% | 20% | 17% |

Total Errors 61

**14%**

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# پێشبین کرنا شێوازێن فێربوونێ ژبۆ چارەسەرکرنا ئاریشا فێرخوازێن کورد بۆ زمانێ ئنگلیزی دفێربوونا دەنگێن زمانێ ئنگلیزی یێن کو دزمانێ کوردی دا نینن

پوختە
دھەر زمانەکی دا ئاخفتنکەران ژمارەیەکا سنورداریا دەنگان ھەیە کو دھێنە لێکدان بۆ چێکرنا پەیڤان. ئوکونەر **(1980)** ڤێ چەندێ وەسف دکەت وەك ھەبوونا ژمارەیەکا سنوردار ژ قوتیکان دھزرێ دا بوو ھەر دەنگەکێ ئەم بکاردئینین. ھەر زمانەکی ھژمارەیەکا جێواز ولێکدانێن جێواز ھەنە بو ڤان قوتیکان ئەوێن بھێزتردبن ببورینا دەمی. وەك ئەنجام دەمێ فێرخواز ھەوڵ ددەن زمانەك نوی فێربین دڤێت ھندەك قوتیکێن نوی دھزراخودا ئاڤابکەن ژبو دەنگێن نوی یێن وی زمانی ئەوێن جێواز دگەل دەنگێن زمانێ دایك. ئەڤ چەندە کارەکێ ئاسان نینە وپێتڤی ب وەرگرتنەکا زۆر ھەیە دزمانێ نوی دا. ژبەر ڤێ چەندێ گەلەك فێرخوازێن زمانی ھەول ددەن ڤالاتیا دەنگان دزمانێ دھێنە گھورین **/ ٠ /** دگەل دەنگێ **/ ٠ /** نوی داب نێزیکترین دەنگێن زمانێ دایك تژیکەن وبگھورن بو نموونە دەنگێ ژبەر کو ھەردوك دەنگ وەك ھەفن ودمشەنە دزمانیِ ئنگلیزی دا.
لێك گھورینا دەنگان بڤی شێوەی ئاریشێن نێگەھشتنێ پەیدادکەن. دەنگێن خشوکین ددانی دوو ژوان دەنگانە ئەوێن بخەلەتی دھێنە خاندن رێژەیەکا مشە ژلایێ فێرخوازێن زمانێ ئنگلیزی. دباوەردایە ئەڤ ئاریشە بێتە چارەسەرکرن (ھینکرنێ) (فێرکرنێ).
ئاریشا فێرخوازێن دگەل ڤان دەنگان دبیت ژ دوو لایاڤەبیت (گوە لێبوون و گوتنا) ڤان دەنگان.
فێرخواز نەشێن ڤی دەنگی ب ئاسانی بێژن ژبەر کو ئەندامێنوان یێن ئاخفتنێ ھی نە سەبارەت پەحنکی یێ دفنێ بووینە سەر لقینێن پێتڤی بو ڤی دەنگی. سەرەرای ڤێ چەندێ ئەو نە شێن ڤی دەنگی ب رونی گوە لێبن وگەلەك جاران ژبەر ڤێ چەندێ کێماسی دشیانێن پێشدینتا ھەبوون ونەبوونا ڤی دەنگی ھەیە **/n.** تێکەل دکەن دگەل گوتنا وان دئاوایێ خودا بئاستەنگن نە تنێ بۆ فێرخوازان بەلێ بۆ ئاخفتنکەرێن زمانێ دایك. و سەبارەت دەنگێن ئاستەنگادی یا ڤان دەنگان دبیت دگوھلێبوونا وان دابیت. ژلایێ ئەکوستیکێ ڤە ڤان دەنگان لێھایی یەکا لاواز ھەیە و ب (جێکیل, **2012**) **/v/** و **/f/** ئاسانی دھێتە شاشکرن دگەل دەنگێن.
دھێتە ھەشیارکرن کو فێرخوازێن کورد بو زمانێ ئنگلیزی دێ ئاریشە دگەل ڤان دەنگان ھەبن بەلێ دشیان دایە ئەڤ ئاریشە بھێنە چارەسەرکردن ب رێکا فێرکرنێ. دەە پشکدار یێن کو فێرکرنا فونەتیکا ئنگتیزی نەوەرگرنێ ھاتنە ژێگرتن ژبو مەرەما شلوڤەکرنێ. داخاز ژوان ھاتەکرن کو **(15)** پەیڤێن وەك ھەڤ ژ ھەر دەنگەکێ دەست نیشان کری بخینن دتیستەکێ دا بەری فێرکرنێ وپاشان دووبارە بھێنە خاندن پشتی فێرکرنێ.
پشتی پشکنینا دەنگێن دەست نیشان کری دھەردوو تیستادا دادیاربوو کو رێژەیا شاشیان دخاندنا ڤان دەنگاندا زۆر کێم بوو ژ **(84%)** بۆ **(14%)**. دیاردبیت کو فێرکرنا ڤان دەنگان زۆر بدیماھیك ئینانا ڤێ ئاریشێ.

## الخلاصة

يكون للمتكلمين في كل لغة أرقام ثابتة من وحدات الصوت, والتي يتم جمعها لتتكون كلمات اللغة. يشبه أوكونور (1980) وحدات تلك الاصوت بصناديق ثابتة, ولكل صوت صندوق موجودة فى الدماغ، وهي التي نلجأ إليها لتشكيل الكلمات عند التحدث. كل لغة لديها عدد وترتيب مختلف من الصناديق التي تصبح أقوى مع مرورالوقت. نتيجة لذلك عندما يحاول متعلمو اللغة تعلم لغة جديدة ذا عدد مختلف من الصناديق مقارنة مع

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لغتهم الأم، فإنهم يحتاجون إلى بناء صناديق جديدة لتلك الأصوات. ان بناء صناديق صوت جديدة للغة جديدة ليس بالأمر السهل, و لا يحصل إلا بالالمام الكافى باللغة الجديدة. و صعوبة بعض الاصوات تدفعهم لاستبدال تلك الاصوات بأصوات مشابهة لها من ناحية النطق. على سبيل المثال: يستبدلون الصوت • • • بالصوت الشائع. هذه البدائل قد تؤدي إلى مشاكل في الفهم.

تعد الاصوات الاحتكاكية السنية في اللغة الإنجليزية من بين الأصوات الأكثر صعوبةً في النطق من قبل متعلمي اللغة الإنجليزية كلغة أجنبية. من المفروض أن يتغلب الطلاب على هذه الصعوبة بعدالتعلم. و مشكلة هذه الأصوات يمكن أن تكون مشكلةً في الادراك بسبب السمع او النطق.اما فيما يتعلق بالصوت الطبقي الأنفي • • • ،لا يمكن للمتعلمين نطقه بسهولة, لأن أعضاء النطق لديهم ليست معتادة على نطق هذاالصوت. فضلا عن عدم تمييز هذا الصوت بسهولة , وغالبا ما يستبدلونه ب/**ng**/. أمابالنسبة للاصوات • • • • و • • • • فهي بطبيعتها اصوات صعبة النطق, ليس فقط للمتعلمين ولكن أيضا لمن يستخدمها فى لغتهم الأم. والصعوبة الأخرى لهذه الأصوات تكمن في قدرة عدم تمييز هذه الأصوات, من الناحية السمعية ،لكون هذه الأصوات ضعيفة إدراكيا ، ويمكن الخلط بسهولة بينها وبين /**f**/أو/**v**/ **(**جيكيل، **2012**).

من المفروض ان المتعلمين الكورد يواجهون صعوبة مع هذه الأصوات لعدم وجودها في اللغة الكردية. ويمكن التغلب على هذه الصعوبات مع التعليم المناسب. ولغرض التأكد من هذه الفرضية تم اختيار عشرة مشاركين لم يتلقوا تعليما سابقا في الصوتيات الإنجليزية. طلب منهم قراءة (**15**) زوجاً متماثلا من كل صوت معني يتناقض مع أصوات مماثلة في اختبار ماقبل التعلم. وطلب منهم لاحقا قراءتها مرة أخرى في اختبار مابعد التعلم. وبعد دراسة النتائج في كلا الاختبارين تبين أن عدد أخطاء النطق قد أنخفض من (**84**٪) إلى (**14**٪). النتائج تبين ان توفيرالتعليم القيم والفعال يساعد في التغلب على هذه الصعوبات.