International J. Soc. Sci & Education
April 2012 Vol. 2 Issue 2, ISSN: 2223-4934 and
2227-393X Print

A Phonetic-Acoustic Study of Sindhi-Accented English for Better English Pronunciation

By

Abdul Malik Abbasi
PhD (Linguistics) Research Scholar
Department of English Language and Literature, School of Social Sciences & Humanities,University of Management and Technology, Lahore, Pakistan

Abstract

The paper investigates the spoken English of Sindhi ESL learners through an acoustic and articulatory phonetics. The research examines the English consonants by articulatory techniques coupled with the spectrograms acoustically on Praat[i] speech processing computer-developed software. The key purpose of the study is to analyze the consonantal sounds which are relatively problem-posing with particular reference to production by SESL[ii] and to achieve an easy way out for ESL learners and ELT[iii] teachers for learn-ability and teach-ability respectively. The study tends to depend on articulatory-phonetic results as cited in data analysis; however, overall data include acoustic analysis, which have not been added to the body of the paper i.e. acoustic realizations. The current study illustrates eleven problem-posing English consonants based on the hypothesis as to why SESL articulate English sounds inaccurately. The study investigates that the phonetic variations occur because of the different sound systems of both languages and mother tongue influence with particular reference to phonetic and phonological differences. The research is carried out under the framework of Contrastive Analysis theory presented by Lado (1967). On account of the large number of students' enrollment from upper Sindh, the convenience/accidental sampling of the population was taken randomly from Cadet College Larkana Sindh, Pakistan.

Keywords: *Sindhi, Phonetics, Phonology, Interference, Mother tongue, ESL, ELT.*

1. Background

Teaching English Pronunciation

The teaching of English pronunciation is an ideal aspect of language teaching. This is one of the essential pedagogical techniques in a language class, which needs to have adequate knowledge of sound systems of L1 and the target language before the language teacher begins teaching pronunciation to ESL/EFL[iv] learners. Many language teachers ignore very important aspect while teaching and some do not possess adequate knowledge of phonetics and phonology (of L1 & L2). The teaching English pronunciation is not only ignored at middle, secondary, higher secondary but also even at college and university level particularly in Upper Sindh. In addition, Sindhi ESL learners of English produce phonetic and phonological deviations and speak Sindhi-accented English rather than English-accented. The study was carried out under the frame CA (Contrastive Analysis) by Lado (1957) in order to determine what English

[i] Praat (Praat is a Dutch word which means 'talk') is a scientific speech processing computer developed software program, which analyses sounds with the help of spectrographs.
[ii] SESL Sindhi (English) second language learners
[iii] ELT English language teachers
[iv] EFL English as a foreign language

phonemes are more problematic to Sindhi ESL learners. Secondly how ESL learners can develop their spoken abilities and how English language teachers can develop their teaching English pronunciation with particular reference to the problem-posing sounds for the targeted population in particular and the world in general. The study of pronunciation involves the essential aspects of L1 and L2 i. e. the sound systems of both languages for an effective teaching purpose as follows:

Sound Systems of English and Sindhi

English and Sindhi languages have different sound systems. English is well-studied language with reference to phonetics and phonology of the language, whereas many aspects of phonetics and phonology in Sindhi remain un-researched, particularly acoustic aspects of the language. English is non-phonetic language and English spellings may be misleading as also noted by Ladefoged (2004) for the English pronunciation. The sound inventories of both languages are encapsulated as follows:

Sound Inventory of English

English consists of 44 sounds i.e. 24 consonantal sounds and 20 vocalic sounds. Eight are diphthongs and 12 are pure vocalic sounds. English is non-phonetic language, in terms of its orthographic system, which does not follow the spellings of words in pronunciation. Roach (2004) cites 24 English consonants /p, b, t, d, k, g, m, n, ŋ, ʧ, ʤ, f, v, θ, ð, s, z, ʃ, ʒ, h, r, j, v, w, l/ and 20 vocalic sounds as follows:/eɪ, aɪ, ɔɪ, əʊ, aʊ, ɪə, eə, ʊə, i, ɪ, ɜː, ə, u, ʊ, e, ʌ, ɔː, æ, ɑ, ɒ/.

Sound Inventory of Sindhi

The Sindhi vocal system consists of 52 consonants coupled with 10 vocalic sounds. The consonantal system consists as follows: /p, pʰ, b, bʱ, t, tʰ, d, dʱ , ʈ, ʈʰ, ɖ, ɖʱ, ʧ, ʧʰ, ʤ, ʤʱ, k, kʰ, g, gʱ, ɓ, ɗ, ʃ, ɠ, [ɖr, ʈr], m, mʱ, n, nʱ, ɳ, ɳʱ, ɲ, ŋ, f, v, s, z, ʃ, q, x, ɣ, ħ, h, r, rʱ, ɽ, [ɽʰ],w, j, l, lʱ/. The vocalic system consists of /ʌ, aː, ɪ, iː ʊ, uː, e, o, ʌo, ʌe / (Allana, Jatoi, 2009, 1996). Jatoi (1996) claims to have eight diphthongs [ɪiː, əʊ, eɪ, əe, əo, ʊu, ʊuː, əiː] in Sindhi and has also cited their minimal pairs. The status of the diphthongs in Sindhi is controversial. Further an acoustic study is needed to determine the exact number of diphthongs.

Mother Tongue Interference/ Transfer

Lado was the pioneering applied linguist who introduced the theory of CA contrastive analysis. Lado (1957) states as follows:

> We can predict and describe the patterns that will cause difficulty in learning, and those that will not cause difficulty by comparing systematically the language and culture to be learned with the native language and culture of the student. In our view, the preparation of the up-to-date pedagogical and experimental materials must be based on this kind of comparison (Lado, 1957 cited in Troike, 2005).

Troike (2005) states "the transfer is positive when the same structure is used appropriate in both languages. Whereas negative transfer (interference) when the L1 structure is used inappropriately in the L2". In this context, Weinreinch (1953) states as follows:

> Phonic interference concerns the manner in which a speaker perceives and reproduces the sounds of the new language, which might be designated secondary, in terms of another, to be called primary. Interference arises when a bilingual identifies a phoneme of the secondary system with one in the primary system and, in producing it, subjects it to the phonetic rules of the primary language.

Corder (1981) explains the positive transfer if similarities exist between L1 and L2. "Where the mother tongue is formally similar to the target language, the learner will pass more rapidly along the developmental continuum (or some parts of it) than where it differs." Jones (1976) argues that English vocalic sounds should be described with reference to the vowels of second language learners' mother

tongue. This may be ensured by a phonetically trained teacher to ascertain native vowels to make ESL learners pronounce English vowels. The transfer and interference go together in learning second language. In this context, Lado (1957) states as follows:

> Individuals tend to transfer the forms and meanings, and the distribution of forms and meanings of their native language and culture to the foreign language and culture - both productively when attempting to speak the language and to act in the culture and receptively when attempting to grasp and understand the language and the culture as practiced by natives. . . . [It assumes] that the student who comes in contact with a foreign language will find some features of it quite easy and others extremely difficult. Those elements that are similar to his native language will be simple for him, and those elements that are different will be difficult.

Orthography of English

The alphabet of English language has 26 letters but consists of total 44 consonantal and vocalic sounds. In addition, each sound contains various numbers of allophones i. e. /t/ English sound has eight allophones as also noted by Kenstowics (2005). When 44 sounds are transcribed in 26 symbols, it creates problems for ESL/EFL learners. Ladefoged (2001) argues that English spelling can be misleading. In English / p / phoneme has one allophone [p^h] with one character but the same allophones are two distinctive phonemes in Sindhi. Davenport and Hannah (1998) argue that English orthography is not based on phonetic system; since a single sound may be transcribed by more than one symbol of orthography. This is one of the major hurdles in accurate production of English sounds particularly in reading and so in speaking. Since English is not phonetic, every English phoneme has more than two allophonic sounds in different syllables of words with the same characters and meaning, while Sindhi characters have no allophones except two allophones spoken in *Northern* dialect of Sindhi.

Articulation and the Vocal Track

Jones (1976) states "the size and shape of the vocal tract may vary for the speakers of different age and sex; however the shape of the vocal tract for the same speaker varies for the production of different vowels. The main articulators involved in changing the shape of the air passage in the oral cavity are the tongue and the lips". As far as velum, palate, alveolar, dental, bilabial, labio-dental, lips and tongue are concerned they are the main articulators for the production of consonants of a language. The larynx which is also called the voice box has an essential role to play with reference to production of human speech. Parson (1987) argues that the vocal track tube is about 17cm long in adult males and the length of the nasal cavity i.e. from uvula to nostrils is approximately 13cm long.

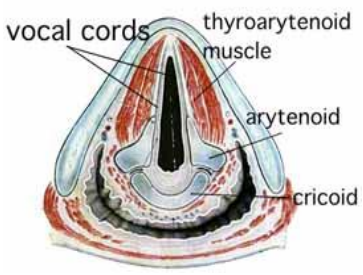

Figure 1: The larynx

Source: Department of Otolaryngology, University of Washington
URL http://jcarreras.homestead.com/rrphonetics1.html

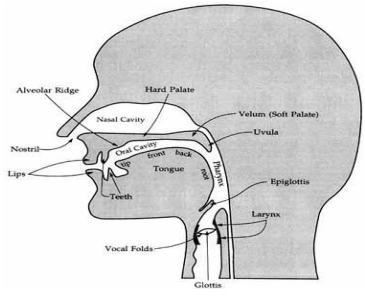

Figure 2: Vocal track

Source: Department of Linguistics, University of Pennsylvania
URL http://jcarreras.homestead.com/rrphonetics1.html

2. Experimentation and Data Collection

Twelve years of informal observation by the author led investigating question regarding Sindhi-accented English spoken as noted in Malik (2009). With a view to looking at the predictions and observations regarding the problematic phonemes of English, empirical data were collected. The targeted sounds were placed in one table in the form of questionnaire as illustrated in Appendix-A Table 1. Ten words for each phoneme were looked up, occurring at five different environments of the word (at onset cluster, word-medial, word-medial onset, word-medial coda and word-final). The words were looked up in "Oxford Advanced Learners' Dictionary of Current English (1991)", in the book "Better English Pronunciation" by Connor (2004) and "Cambridge pronouncing English dictionary" by Daniel Jones (2007). The subjects were given the same script earlier so that during recording one should not be confused. In this context, the 11 consonantal phonemes were placed in text form for the sounds analysis. Each subject was asked to read out words written on cards size 4/4 in carrier sentence aloud, so that the actual sound could be heard and recorded on Praat speech processing software. However, the study did not apply the instrumental techniques of , but rather study depended on the manual information of the subjects coupled with author's knowledge of articulation by Sindhi native speakers. The subjects were also asked as to what active articular touches the passive articulator while producing the targeted sounds. The carrier sentence was used as follows: [I say **th**ink also]
The bold and underlined word was replaced by other words respectively. The carrier sentence was structured in such a way as the targeted phoneme may not be affected by neighboring consonantal sound. That is why the targeted word was placed in between the vowels. For recording purpose, laptop Acer Travel Mate core i3 and highly sensitive mike were used in order to record undisturbed voice quality. To escape the voice disturbance, recording was made in computer laboratory in order to record the data undisturbed. ELT teachers were interviewed in detail regarding their teaching pronunciation to ESL learners. Very few teachers informed that they teach English pronunciation to ESL learners by just correcting incorrect pronunciation. However, very few teachers had know-how of phonetics and phonology on elementary level.

Accidental / Convenience Sampling
The sampling of the population was randomly selected from Cadet College Larkana. Since the total 10 male subjects with no speech impairment were from Upper Sindh, they all were selected from CCL representing whole Sindh particularly Upper Sindh. For this study, two groups of secondary and higher secondary level ESL learners were selected. Both groups were having six and seven years of English language learning at school as a subject in ESL setting. ESL learners were taught under Sindh Text Book Board English books. Since the few second language learners studied in private English medium schools, they had seven to nine years of English language exposure. The reliability of the research is based on pilot testing through questionnaire and the observer, the author himself; who had experience of teaching English language to Sindhi ESL learners at secondary and higher secondary level at the same college for more than seven years, from where the data were collected. Apart from the student subjects, there were 5 English language teachers as the participants of this research.

Instrumentation
The laptop Acer Travel Mate core i3 was used for recording purpose; the Praat software was installed in order to record and analyze the voice frequency. The most sensitive mike with following specifications: EV- Electro-voice CO7 balt, professional microphones; frequency response: 50 H2 to 18 kHz; was used, coupled with headphones in order to check voice recording being transmitted properly. Each sound at five positions of words was repeated ten times initially and non-initially by ESL learners. This means, every potential problematic phoneme was sentence on separate flash card size 4x4 inches. Those cards were shuffled while each subject came and recorded the voice. However, all those words were already written on an A4 size paper shown to the subjects before they turned up for recording. The written instructions were distributed with verbal instructions to the subjects, in order to avoid confusion during recording the voice.

3. **Data Analysis**

1. **/ p /** **(Voiceless Bilabial Stop)**
The phoneme voiceless bilabial stop is some degree major problem-posing sound for Sindhi ESL learners. There may be a couple of reasons; it has one character with two sounds. One is aspirated and another is un-aspirated (two allophones) as reported by the subjects and noted by the author. In Sindhi there are two different phonemes for the same English phoneme i.e. aspirated and un-aspirated. So, Sindhi native speakers pronounce the sound of / p / on every environment of the word as un-aspirated. It means word-initially, medially onset and coda and finally / p / phoneme is pronounced without aspiration. However, some cases were found where few ESL learners articulated / p / aspirated initially analyzed on Praat as stated by as noted in Malik (2009). The Figure 1 cites that the /p/ sound was produced 75% intelligible and 25% imperfect but close to native like by SESL learners.

2. **/ t /** **(Voiceless Alveolar Stop)**
The phoneme voiceless alveolar stop is to some extent major problem-posing sound for Sindhi ESL learners. This is also the same case of single orthographic representation in English and has eight allophones as noted by (Kenstowics, 1994). One is aspirated and another is un-aspirated as reported by the subjects and noted by the author. In Sindhi there are two characters for the same phoneme with two different sounds i.e. aspirated and un-aspirated. Both are two distinctive phonemes in Sindhi while in English two sounds with the same meaning, creates problem for Sindhi ESL learners. In this connection, Sindhi native speakers pronounce the sound of /t/ in every environment of the word as un-aspirated. Phoneme /t/ is pronounced without aspiration, as it occurs at word-initially, medially onset, coda and finally. Again the major-posing difficulty is of character orthography, which is wholly responsible for mispronunciation of sounds as discussed by noted in Malik (2009). As Figure 1 illustrates that the /**t**/ sound was articulated intelligible but Sindhi-accented and close to native by ESL learners 76 % and 24 % respectively.

3. **/ k /** **(Voiceless Velar Stop)**
The phoneme voiceless velar stop is also some degree major problem-posing sound for Sindhi ESL learners. There may be the same case of orthographic representation in English with two variants i.e one is aspirated and another is un-aspirated as reported by the subjects and noted by the author. In Sindhi there are two characters for the same phoneme of English with two sounds i.e. aspirated and un-aspirated with two different meaning. Both are two distinctive phonemes in Sindhi while in English two sounds with the same meaning, causes problem for Sindhi ESL learners. Sindhi native speakers pronounce the sound of / k / in every environment of the word as un-aspirated. It means word-initially, medially onset & coda and finally /k/ phoneme is pronounced without aspiration. The major problem is of character orthography, which causes the inaccuracy of articulation as argued by as noted in Malik (2009). 70 % as illustrated in Figure 1 / k / sound was articulated intelligible and 30 % close to native like by ESL learners.

4. **/ θ /** **(Voiceless Inter-dental Fricative)**
The phoneme voiceless inter-dental fricative is articulated when the tip of the tongue is close to the upper front teeth. The air friction creates noise, which is not more than / s, z / fricatives. This fricative is one the most problem posing sounds to Sindhi ESL learners. The sound is replaced with the / t^h/and sometime with /s/ sound, which is pronounced with some degree of aspiration. The voiceless / θ / inter-dental fricative is pronounced as aspirated voiceless dental stop as reported by the subjects and noted by the author. Since Sindhi phonology is lack of this sound, so ESL learners have a major problem in producing this accurately as analyzed by as noted by (Malik, 2009). In other words, this sound is replaced with the nearest one as existing in L1. 3 % as illustrated in Figure1 that ESL learners pronounced close to native while 97 % intelligible but Sindhi-accented.

5. **/ ð /** **and /ʊ/ (Voiced Interdentally Fricative and Voiceless Interdentally Fricative)**
The interdentally phonemes have always remained problematic for Asian learners, especially Pakistanis, particularly Sindhi native speakers. These interdentally fricatives are replaced by / tʰ/ and /d̲/ existing in Pakistani local languages as also noted by Rahman (1990). In this context, Sindhi native speakers have the same problem as reported by the subjects and noted by the author. The voiced interdentally fricative sound / ð / is replaced by / tʰ / and / d / both existing in Sindhi language. That is why this fricative/ð/ is also major problematic. The sound as in '**then**', is also replaced by / d / sound existing in Sindhi. The interdentally fricative does not exist in Sindhi phonology, which is why it is substituted by the nearest sound available in L1. 4 % as illustrated in Figure 1 that ESL learners articulated close to native while 76 % intelligible but Sindhi-accented.

6. **/ r /** **(Voiced Liquid)**
The Phoneme voiced liquid is replaced by the sound / r / existing in Sindhi language. While articulating this sound in Sindhi the tip of the tongue touches the alveolar ridge and taps twice/thrice times as reported by the subjects and noted by the author. In English language, tongue has curved shape with the tip pointing towards the hard palate at the back of the alveolar ridge, the front low and the back rather high. Connor (2004) argues that in RP (Received Pronunciation) **/ r /** sound occurs before vowels and never before consonants, in this context, he has given some examples the words like "learn"**,** "sort" and "farm" in these three words **/ r** / sound is elided **/** lɜ:n, sɔ:t, fɑ:m **/**. Nevertheless, in most of the cases as predicted that Sindhi native speakers articulated with stress on / r /. This was not only observed in ELT teachers' interviews but also they themselves pointed out that Sindhi ESL learners stress on the same sound as noted in Malik (2009). 80 % as illustrated in Figure 1 that second language learners pronounced intelligible but Sindhi-accented while 20 % close to native like.

7. / ʒ / **(Voiced Palato-Alveolar Fricative)**
The phoneme the voiced palato-alveolar fricative is substituted mostly by a palatal un-rounded semi-vowel / j / and casually by the voiced alveolar fricative /z/ as well; as reported by the subjects and noted by the author manually and through acoustic realizations. This sound does not exist in Sindhi that is why only 6 % subjects as shown in Figure 1 were able to pronounce / ʒ **/** sound imperfect close to native like while 74 % ESL learners articulated intelligible but Sindhi-accented. Above both substitute sounds are used instead of / ʒ / native like sound. Semi-vowel /j/ and fricative /z/ do exist in Sindhi that is why / ʒ / is replaced by these both sounds as also cited in Malik (2009). 74 % as illustrated in Figure 1 that ESL learners pronounced the sound intelligible but Sindhi-accented while only 06 % close to native like.

8. / tʃ / **(Voiceless Palatal Affricate)**
The phoneme voiceless palatal affricate was articulated as palatal-alveolar but Sindhi-accented as reported by the subjects and as noted by the author manually and acoustic realizations as well. Sindhi ESL learners pronounced close to English affricate. The spectrogram realizations illustrate to be close to English affricate. And as cited in Figure 1 that ESL learners pronounced 46 % Sindhi-accented while 34 % imperfect close to native the targeted sounds.

9. **/ dʒ /** **(Voiced Palatal Affricate)**
The phoneme voiced palatal affricate sound in English. This sound is articulated as Sindhi-accented voiced palatal-alveolar /dʒ /. The spectrogram illustrates through the acoustic cues that Sindhi native speakers produce this sound close to English affricate as illustrated in Figure 1 and as reported by the subjects and noted by the author. As cited in Figure 1 that 50 % ESL learners pronounced voiced affricate as intelligible and 30 % close to native like. This sound is not more problem-posing sound for Sindhi ESL learners.

10. **/ v /** **(Labio-Dental Voiced Fricative)**
The phoneme labio-dental voiced fricative is one of the major problematic sounds. This was identified as noted by the author through acoustic cues as well that it was articulated by ESL learners with bilabial

continuant with lips in a neutral position as reported by the subjects and noted by the author. This sound exists in Sindhi as in /*həva*/ 'wind'. As illustrated in Figure 1 that 60 % ESL learners pronounced intelligible but Sindhi-accented while 20 % close to native like.

11. **/ w /** **(Labio-Velar (semi-vowel))**

The phoneme is labio-velar (semi-vowel). It is articulated with rounded lips by English native speakers. Sindhi native speakers do not differentiate between /w/ and /v/ in pronunciation as reported by the Sindhi native speakers manually and noted by the author through acoustic cues as well. These two characters of English language create major problems for Sindhi native speakers because only one character exists in Sindhi alphabet, however both sounds exist in Sindhi phonology as also noted by Allana (2009). That is why both / w / and / v / are pronounced in the same way as / v / is pronounced without rounding lips and sometimes with rounded lips as in Sindhi word /*hʊwa*/ 'happen'. 60 % ESL learners pronounced intelligible but Sindhi-accented while 20 % close to native like. Below Figure 1 illustrates that overall percentage of utterances of targeted sounds articulated by Sindhi speakers of English.

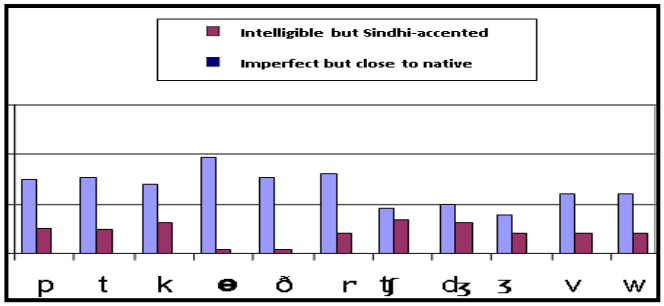

Figure 1: illustrates the total utterances produced by SNS

4. Discussion

The current study analyzed 11English consonants which are as cited in Appendix-B the gap analysis Table 2: Three voiceless stops / p, t, k / a voiceless and a voiced inter-dental fricatives / ɵ, ð/, a labio-dental voiced fricative **/** v **/,** a voiced palatal-alveolar fricative **/** ʒ /, two palato-alveolar voiceless and voiced affricates / ʧ, ʤ/ , a glide **/** w **/** labio-velar and another consonant the liquid / r / have been found more problematic for Sindhi ESL learners. The most problem-posing English sounds are /ɵ, ð/ voiceless and voiced inter-dental fricatives, whereas, other consonants are relatively less problematic with reference to their articulation by Sindhi native speakers. In addition, the teachers had an inadequate background of phonetics and phonology. Though, several teachers had long experience of teaching, yet some had a bit enthusiasm of teaching pronunciation. English language teachers as part of this research study were interviewed in detail as follows: One ELT teacher emphasized on L1 and L2 sounds learning before teaching pronunciation to ESL learners. He also pointed out that Sindhi ESL learners often stress on / r / sound occurring any position of the word and do not aspirate three plosives / p, t, k / word-initially. In an interview with in-charge of language laboratory, he argued that Sindhi ESL learners could easily learn correct pronunciation of words, if they were taught first phonetic symbols. He also emphasized that there are not only some spelling-pronunciation problems but also consonantal problems. Another teacher, in charge English annual magazine argued that there was a relatively more impact of socio-linguistic background on ESL learners which affect their pronunciation. He also admitted that Sindh text books of English have no units on pronunciation. Another English language teacher stated that Sindhi ESL learners do not differentiate between / w / and / v / sounds of English. Moreover, no ELT teacher responded while talking about sounds of both languages. They also supported the idea of knowing both language sounds, in order to develop ease for learning and teaching pronunciation.

5. Conclusion

The study tried to determine the mechanism of pedagogical materials to be applied by both ESL learners and ELT teachers through the study findings. As Robert Lado (1957) states regarding the prediction of patterns which cause difficulty and ease for second language learners in learning foreign language. The Appendix-B (gap analysis) Table 2 illustrates explicitly the similarities and dissimilarities of both English and Sindhi with reference to the sound systems of both languages. In addition, Sindhi ESL learners mostly rely on the orthography of English (because of the non-availability of English native speakers) which is not phonetic that is why they pronounce Sindhi-accented English and because of the different aspects of phonetics and phonology. As cited by Lado (1957) that the similarities and dissimilarities of L1 and L2 should be compared to for pedagogical purposes while Jones (1976) states that English vowels should be taught to ESL learners through their mother tongue vowel sounds for better English pronunciation. The findings of this research would provide some comprehensive phonetic knowledge to the existing knowledge in teaching English pronunciation. Sindhi ESL learners of English and teachers would be more beneficiary to study the findings of this research in order to teach English pronunciation to Sindhi second language learners in particular and in the world of phonetics and phonology in general.

There are several aspects of the sound system of Sindhi language, which still need to be researched. Since this study covers only major problem-posing consonantal sounds, other areas remain open for research for example a comparative study of vowel sounds both Sindhi and English for learn-ability and teach-ability. Moreover, vast field of Sindhi syllables, stress and intonation are certain areas of research which still remain open for study. No any comparative and scientific study has been carried out on these supra-segmental features of Sindhi and English, which really need to be researched in terms of ELT context. This should be taken as a comparative study of English and Sindhi supra-segmental features for the purpose of English language teaching to Sindhi ESL learners. Apart from this, the current study has only touched upon the sounds of Sindhi especially in terms of *Northern* dialect of Sindhi speaker's speech with Standard English. There are several other dialects of Sindhi, which need to be studied. There are some recommendations as follows:

- The teaching of pronunciation must be involved by the sound system of MT (mother tongue) while teaching to ESL learners.
- The research findings should be included in English text books of Sindh text book board for learning and teaching English sounds to Sindhi native speakers.
- Sindhi native speakers are highly recommended to listen to BBC news, informative English documentary films in order to be familiarized with native spoken English.
- Major and minor problematic sounds coupled with their pronunciation should be made to listen to ESL learners through audio and video clips in English language class rooms. The same must also be drilled daily so that second language learners may achieve native like proficiency in communication.
- English language teachers should be trained through workshops particularly on phonetics and phonology with reference to English pronunciation.

References

Allana, G.A. (1967). *Sindhi phonetics*: (*Sindhi Sotiyat)* (1st ed.), Hyderabad, Sindh printing press Hyderabad.

Bughio, M. Q. (2001-2004). *Socio-linguistics of Sindhi,* (Pakistani ed.), published by Lincom Europe, Germany.

Corder, S.P. (1981). *Error analysis and inter-language*. Oxford: Oxford university press.

Connor, O. J. D. (1980). *Better English pronunciation*, (2nd ed.), U.K, CUP International sales department, the Edinburgh building, Cambridge CM2 2RU.

Davenport, Mike & Hannahs. S. J. (1998). *Introducing phonetics and phonology*: First published in Great Britain by Arnold, London NW1 3 BH.

Figures no: 1 & 2 (2012). Extracted on 20 Jan. 2012 from URL http://jcarreras.homestead.com/rrphonetics1.html

Jatoi, A. N. (1996). *Linguistics and Sindhi language (Ilm Lisan Ain Sindhi Zaban)*, (3rd ed.), Hyderabad institute of Sindhology. Sindh university press. ISBN 969-405-057-X.

Jones, D. (2005). *Cambridge English pronouncing dictionary*, (16th ed.), Edited by Roach, P., Hartman. J & Setter.J. Cambridge university press.

Jones, D. (1976). *An outline of English phonetics*, (9th, ed.). Cambridge university press. London.

Kenstowicz, M. (1994). *Phonology in generative grammar*, (2nd Edition) USA: Blackwell publishers 238 main street Cambridge, Massachusetts 02142, USA.

Lado, R. (1957). *Linguistics across cultures.* Ann Arbor,MI: University of Michigan Press.

Lado, R. (1963). *Linguistics across culture.* Toronto: University of Michigan Press.

Ladefoged, P. (2001). *A course in phonetics,* (4th ed.), Harcourt college publishers, University of California, Los Angeles.

Malik, A. A. (2010). *The production of English consonants by Sindhi ESL learners*: The phonetic and phonological effects of Sindhi on spoken English. Published & printed in Germany, USA and UK by VDM Verlag Dr. Muller e.k ISBN 978-3-639-25281-1.

Oxford advanced learner's dictionary of current English. (1991). (6th impression), published by Oxford University Press.

Oxford advanced learner's dictionary of current English. (1992). (Encyclopedic ed.) published by Oxford University Press.

Parson, W. T. (1987). *Voice and speech proceesing*. MacGraw-Hill.

Roach, P. (2004). *English phonetics and phonology*, India, printed by Replika Press Pvt.Ltd. Kundli.131028.

Rahman, T. (1997). *An introduction to linguistics,* Pakistan: Vanguard Books Pvt Ltd; 1997.

Troike, M. S. (2006). Second language acquisition. Introduction to language and linguistics. Cambridge university press.

Weinreich, U. (1953). *Languages in contact*: Findings and problems. New York: Linguistic circle of NY,1.

Appendix- A

Table 1: Questionnaire of the Research

S/No	Phonemes	Onset Cluster	Word-initial	Word-medial onset	Word-medial coda	Word-final
1	p	Sprite Spring	Police Pot	Compare Company	Incipient Recipient	Hope Gap
2	t	Strong Stroll	Two Ten	Strategy Sweater	Gentle Little	Student Obedient
3	k	Crime Crystal	Kind Country	School Secret	Dock Lock	Ask Mosque
4	ð	[Does not occur CC initially]	There Than	Rather Other	Rhythm Tether	Smooth With
5	ɵ	Threat Throat	Think Thank	Author Healthier	Strengths Breadths	Faith Tooth
6	r	Strive Straw	Read Right	Farm Charm	Spirit Girl	Better Author
7	ʒ	[Does not occur CC initially]	Genre Gigolo	Pleasure Vision	Azure Camouflage	Barrage Garage
8	tʃ	[Does not occur CC initially]	Chin Cheer	Catching Watching	Mitchell Such-like	Teach Watch
9	dʒ	[Does not occur CC initially]	Job Juice	Danger Major	Hedgehog Sledgehammer	Village Strange
10	v	[Does not occur CC initially]	Veil Vine	Never Over	Movable Drivable	Leave Save
11	w	Wring Wrong	Well Wine	Twice Twelve	Bowl Bowline	Window Bow-wow

Appendix-B

Table 2: Gap Analysis of English and Sindhi Sounds

Vowel	English	Sindhi	Consonants	English	Sindhi
Short			Plosives		
ɪ	✓	✓ [v]	/p/	✓	✓
e	✓	✓	/pʰ/	✓	✓
æ	✓	φ[vi]	/b/	✓	✓
ʌ	✓	✓	/bʰ/	φ	✓
ɒ	✓	φ	/t̪/	φ	✓
ʊ	✓	✓	/ t̪ʰ/	φ	✓
ə	✓	φ	/t/ (Retroflex)	φ	✓
o	φ	✓	/t/ (Alveolar)	✓	φ
-	-	-	/ tʰ/ (Retroflex)	φ	✓
			/tʰ/ (Alveolar)	✓	φ
-	-	-	/d̪/	φ	✓
-	-	-	/d̪ʰ/	φ	✓
-	-	-	/d/ (Alveolar)	✓	φ
Long Vowel	English	Sindhi	Consonant	English	Sindhi
iː	✓	✓	/dʰ/	φ	✓
ɑː	✓	✓	/ɖ/ (Retroflex)	φ	✓
ɔː	✓	φ	/ɖʰ/ (Retroflex)	φ	✓
uː	✓	✓	/k/	✓	✓
ɜː	✓	φ	/kʰ/	✓	✓
_	_	_	/g/	✓	✓
Diphthongs	English	Sindhi	/gʰ/	φ	✓
ʌo	φ	✓	**Fricatives**	-	-
ʌe	φ	✓	/f/	✓	✓
eɪ	✓	φ	/v/	✓	✓
aɪ	✓	φ	/s/	✓	✓
ɔɪ	✓	φ	/z/	✓	✓
əʊ	✓	φ	/ʃ/	✓	✓
aʊ	✓	φ	/x/	φ	✓
ɪə	✓	φ	/ɣ/	φ	✓
eə	✓	φ	/h/	✓	✓
ʊə	✓	φ	/ɵ/	✓	✓

[v] √ representation of presence of sound
[vi] Φ representation of absence of sound

–	–	–	/ð/	✓	✓
–	–	–	/ʒ/	✓	φ
-	-	-	Consonant	English	Sindhi
-	-	-	**Nasals**		
-	-	-	/m/	✓	✓
–	-	-	[mʰ]	φ	✓
–	–	–	/n/	✓	✓
–	–	–	[nʰ]	φ	✓
–	–	–	/ŋ/	✓	✓
–	–	–	/ɳ/	φ	✓
-	-	-	[ɳʰ]	φ	✓
-	-	-	/ɲ/	φ	✓
-	-	-	**Affricates**	English	Sindhi
–	–	–	/c/	φ	✓
-	-	-	/cʰ/	φ	✓
-	-	-	/ɟ/	φ	✓
-	-	-	/ɟʰ/	φ	✓
–	-	-	/tʃ/	✓	✓
–	–	–	/dʒ/	✓	✓
–	–	–	[tr]	φ	✓
–	–	–	[ʈʰr]	φ	✓
–	–	–	[ɖr]	φ	✓
–	–	–	[ɖʰr]	φ	✓
–	–	–	Approximants	English	Sindhi
-	-	-	/l/	✓	✓
			/lʰ/	φ	✓
-	-	-	Rohtic /r/(Trill)	φ	✓
-	-	-	Non-Rohtic /r/(Alveolar)	✓	φ
-	-	-	[rʰ]	φ	✓
–	-	-	/j/	✓	✓
–	–	–	/w/	✓	✓
–	–	–	Implosives	English	Sindhi
–	–	–	/ɓ/	φ	✓
-	-	-	/ʄ/	φ	✓
-	-	-	/ɗ/	φ	✓
-	-	-	/ɠ/	φ	✓
–	-	-	Flapped	English	Sindhi
–	–	–	/ɽ/	φ	✓
–	–	–	[ɽʰ]	φ	✓