Interactive IPA Chart to Improve English Pronunciation of ESL Students – An Experimental Study

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Abstract

Achieving goals practically in a reproducible way by applying knowledge is possible using technology. Teaching English is not an exception in applying technology for effective results. In the field of English Language Teaching (ELT), very few teachers focus on teaching English pronunciation. Though this aspect of ELT is rare, it has become a vital aspect of ELT in today's world due to globalization of English language and enormous use of English in everyday life. The present time can be considered as a golden era for learning as our lives are aided by technology. As we use technology abundantly every day, it is not wrong to use the same for learning. In fact, teaching and learning can be effective when they are aided by technology. Moreover, CALL (Computer Assisted Language Learning) is one of the approaches in ELT, used widely by innovative teachers and learners of English, proved to be an efficient approach than traditional methods of teaching IPA. So, the present work is focused on teaching English pronunciation for ESL students using interactive IPA chart assisted by pre-test, intervention study, and post-test to analyse and attempt to meet the needs of students in learning English pronunciation. In order to check the effectiveness of the use of IPA chart, first, a pre-test was conducted with words focusing the pronunciation of all the 44 sounds of English to analyse the deviation of students' pronunciation from the Received Pronunciation (RP). Then, based on the outcome of pre-test, an intervention study was conducted to provide the necessary input to address the students' pronunciation problems. At this stage, students were taught all the 44 sounds of English using interactive IPA chart, so that they can clearly distinguish the differences between the sounds of English and the sounds of their mother-tongue. These

subtle differences are often not paid attention due to ignorance, confusion, mispronunciation and mother-tongue influence. After proper leaning is achieved by the students, a post-test was conducted which helped to analyse the improvement in students' pronunciation. Upon achieving improved performance in students' pronunciation, it can be clearly concluded that use of interactive IPA chart in teaching English pronunciation for ESL students is one of the innovative ways to teach English pronunciation to the students with effectiveness and ease. This would really help the future teachers of English and students.

Keywords: pre-test, post-test, intervention, pronunciation, IPA Chart, ELT, CALL, RP

Introduction

English has become a global language and it is essential language to be learned for this era of social media and people have to learn this language to become more global citizens. English language plays a vital role in our day-to-day life as it is one of the requirements for educational purposes, professional work and for self-improvement. According to Rini (2014), English has become a necessary element in our life since people can get more salary and better opportunities if they have proficiency skills in English language. Therefore, a lot of students study their courses in English medium and many schools, colleges and universities compete to offer many courses and trainings to sharpen their students' communication skills in English and help them to master their language skills. As stated by Janu (2020), speaking (in English) is a skill that successfully shows how well students learn and are good at their second language. From this, it can be understood that speaking in English language mirrors their level of English language learning. For this reason, it is very essential for students, who want to become proficient in English speaking skills, have to learn and use proper pronunciation of English words.

Pronunciation is one of the most essential skills that students need to acquire in English language learning. It has become a part and parcel of language learning as it affects language competency of the learners. Gilakjani (2016) argues that having intelligible pronunciation is one of the fundamental necessities of learners' language skills, and it is also considered as one of the most significant features in language learning and teaching environment. It also supports the statement given by Varasarin (2007) who says that pronunciation is vital for learning speaking skills in any second language learning. So, by acquiring proper pronunciation or correct sounds of English words, learners can make others understand their ideas, thoughts messages and so on (ASC English, 2020) to have proper communication among themselves. On the other hand, for a building, how setting up a foundation is very important, learners need to set up a foundation which helps them understand the material and goals they want to achieve. In this case, if learners want to pronounce English words correctly, they need to know and learn the International

Phonetics Alphabet (IPA). As Szcześniak and Porzuczek (2019) believe that learners not only learn to use the IPA to transcribe the sounds of English, but also they benefit to improve their pronunciation. To make it simple, if learners want to produce proper pronunciation of English words, they need to learn and must be able to use the IPA. Furthermore, if learners do not have proper consciousness of this need, they cannot acquire correct pronunciation of English words.

In this context, as it is found by many researchers, Telugu speaking English learners also have some problems in acquiring proper pronunciation of English words. Having realized and understood those problems and obstacles, the researchers conducted this experimental study by using interactive IPA chart to improve English pronunciation of ESL learners.

Methodology

This section discusses the materials designed, number of informants involved, the devices used and the procedure in which the experiment was carried out.

Materials and tools used in the study:

1. Transcend MP3 player MP 330 was used for recording sounds uttered by students.

2. Cambridge English pronouncing dictionary was used to decide 44-word list for 44 sounds of English.

3. Pre-test (List of 44 words)

4. Content for intervention study

5. Online interactive IPA Chart, which includes vowel diagram and consonant chart, was used to teach English sounds as well as to compare English sounds with the sounds of informants' mother tongues.

URL: https://www.ipachart.com/

6. Post-test (List of 44 words)

7. Dell laptop was used to play sounds from the internet from above URL.

8. Analysis of informants' voice recordings from the pre-test and post-test was carried out using standard media player (VLC Media Player).

9. Analysis of data was done using MS Office 2019 (MS Excel).

A total number of 10 informants were involved in this study. To ensure homogeneity of the informants' group, the data was collected from recently graduated students, whose mother tongue is Telugu.

All the informants were informed of the procedure regarding data collection and usage of their data. Informants were also asked to provide their personal information for further use, in case of need for increased data collection. It was assured that confidentiality of the collected data (both audio and questionnaire data) will be maintained.

This research attempts to experiment by conducting a pre-test. This pre-test is a diagnostic test. First, informants were asked to read 44 words that contain 44 sounds of English for pre-test, the utterances were recorded with the help of a voice recorder (Transcend MP3 player MP 330).

The uttered sounds were analysed to know if they are pronounced accurately and deviations from Received Pronunciation were noted. This gives the needed input to design content and materials for the intervention study.

Secondly, IPA Chart was used in the intervention study, where all the sounds of English that are similar to informants' mother tongue sounds are clearly distinguished and explained. Moreover, all the deviations from RP, uttered by informants are corrected and explained.

Finally, to check the understanding and improvement, a post test was conducted, in which a different set of 44-word list that contain 44 sounds of English was given to them to read aloud. The utterances were recorded again using the same recording device as before and the recordings were transcribed and analysed to gauge the progress made by informants in pronouncing words accurately when compared with the data of the pre-test. The minimized difference in deviation is discussed in the Results section.

A general account of problems faced by Telugu speakers which was discussed in the intervention study is taken from the study entitled 'Need for Tailor-made English Coursebooks to Meet the Desired Learning Outcomes with Special Focus on Phonetics and Spoken English' (Syam, 2021).

Results

The pre-test and post-test results presented in this study are based on the data collected from 10 informants. The study checks the utterances of the informants for two parameters, which are given as follows:

1. whether a specific phoneme is pronounced properly or not
2. whether the entire word is pronounced properly or not

Checking the pronunciation of a specific phoneme is done with the help of the column header 'Target phoneme missing'. The column shows a number from 10 to 0 where, 10 indicates that all the informants could not produce the targeted phoneme; and 0 indicates that all the informants could produce the targeted phoneme.

Checking the pronunciation of the entire word is done with the help of the column header 'No of deviations'. The column shows a number from 10 to 0 where, 10 indicates that all the informants could not produce the word properly; and 0 indicates that all the informants could produce the word properly. In addition to the number in the column 'No of deviations', the transcribed word is highlighted to indicate which informant produced the word with deviant pronunciation, and the transcription shows the deviation.

The study attempts to analyse the scores in percentages. The analysis of pre-test and post-test can be seen in the tables presented and the description of the respective tables that follow.

Pre-test results

English Phoneme	Word / Audio	1 — audio_1	2 — audio_2	3 — audio_3	4 — audio_4	5 — audio_5	6 — audio_6	7 — audio_7	8 — audio_8	9 — audio_9	10 — audio_10	No of deviations	Target phoneme missing
/p/	pen	[pen]	[pen]	[pen]	[pen]	[pen]	[penə]	[pe:n]	[pen]	[pen]	[pen]	2	0
/b/	bin	[bin]	[bin]	[bin]	[bin]	[bin]	[bɪnə]	[bi:n]	[bin]	[bin]	[bin]	10	0
/t/	tip	[tip]	[tip]	[tip]	[tip]	[tip]	[tɪpə]	[ti:p]	[tip]	[tip]	[tip]	10	0
/d/	dig	[digə]	[digʰ]	[dig]	[dig]	[dig]	[dɪgə]	[di:g]	[dig]	[dig]	[dig]	10	0
/k/	cat	[kæt]	[kæt]	[kæt]	[i:t]	[kæt]	[kæt]	[kæt]	[kæt]	[kæt]	[kæt]	1	1
/g/	gut	[gɐt]	[gɐt]	[gɐt]	[gɐt]	[gɐt]	[gɐtə]	[gɐ:t]	[gɐt]	[gɐt]	[gɐt]	10	0
/tʃ/	charge	[tɐ:dz]	[tɐ:dz]	[tɐ:rdz]	[tɐ:rdz]	[tɐ:rdz]	[tɐ:rdz]	[tɐ:rdz]	[tɐ:rdz]	[tɐ:rdz]	[tɐ:rdz]	10	10
/dʒ/	jet	[dzet]	[dzet]	[dzet]	[dzet]	[dzet]	[dzet]	[-----]	[dzet]	[dzet]	[dzet]	10	10
/m/	met	[met]	[met]	[metʰ]	[met]	[met]	[metə]	[me:t]	[met]	[met]	[met]	3	0
/n/	net	[net]	[net]	[netʰ]	[net]	[net]	[netə]	[ne:t]	[net]	[net]	[net]	3	0
/ŋ/	sing	[siŋ]	[siŋ]	[siŋ]	[siŋ]	[siŋ]	[siŋə]	[siŋ]	[siŋ]	[siŋ]	[siŋ]	10	0
/f/	fix	[fiks]	[fiks]	[fiks]	[fiks]	[fiks]	[fiks]	[fi:ks]	[fiks]	[fiks]	[fiks]	10	0
/v/	vent	[ʋent]	[ʋent]	[ʋentʰ]	[ʋent]	[ʋent]	[ʋentə]	[ʋe:nt]	[ʋentʰ]	[ʋent]	[ʋent]	10	10
/θ/	think	[t̪ink]	[t̪ink]	[t̪ink]	[t̪ink]	[t̪ink]	[t̪inkə]	[t̪ink]	[t̪ink]	[t̪ink]	[t̪ink]	10	10
/ð/	that	[d̪et]	[d̪et]	[d̪et]	[d̪et]	[d̪et]	[d̪etə]	[d̪ɐ:t]	[d̪et]	[d̪et]	[d̪et]	10	10
/s/	seal	[si:l]	[si:l]	[si:l]	[si:l]	[si:l]	[si:l]	[si:l]	[si:l]	[si:l]	[si:l]	0	0
/z/	zeal	[dzi:l]	[dzi:l]	[dzi:l]	[zi:l]	[zi:l]	[dzi:l]	[dzi:l]	[zi:l]	[dzi:l]	[dzi:l]	7	7
/ʃ/	shore	[ʃo:r]	[ʃo:r]	[ʃo:r]	[ʃo:r]	[ʃo:]	[ʃo:r]	[ʃo:r]	[ʃo:]	[ʃo:r]	[ʃo:r]	10	0
/ʒ/	measure	[mezɐr]	[mezɐr]	[mezɐr]	[mezɐr]	[mezɐr]	[mezɐr]	[mezɐr]	[mezɐr]	[mezɐr]	[mezɐr]	10	10
/r/	rat	[ræt]	[ræt]	[rætʰ]	[ræt]	[ræt]	[ræt]	[ræt]	[ræt]	[ræt]	[ræt]	1	0
/j/	yeast	[i:st]	[i:st]	[i:st]	[i:st]	[i:ʃt]	[i:ʃt]	[i:st]	[i:st]	[i:st]	[i:st]	10	10
/w/	will	[ʋil]	[ʋil]	[ʋil]	[ʋil]	[ʋil]	[ʋilə]	[ʋil]	[ʋil]	[ʋil]	[ʋil]	10	10
/l/	lime	[laɪm]	[laɪm]	[laɪm]	[laɪm]	[laɪm]	[laɪm]	[laɪm]	[laɪm]	[laɪm]	[laɪm]	0	0
/h/	hit	[hitə]	[hit]	[hitʰ]	[hit]	[hit]	[hitə]	[hi:t]	[hit]	[hit]	[hit]	10	0
/ɪ/	inch	[inte]	[inte]	[inte]	[inte]	[inte]	[inte]	[inte]	[inte]	[inte]	[inte]	10	10
/i:/	east	[i:st]	[i:st]	[i:stʰ]	[i:st]	[i:st]	[i:ʃt]	[i:st]	[i:st]	[i:st]	[i:st]	2	0
/e/	every	[eʋri]	[eʋri]	[eʋri]	[eʋri]	[eʋri]	[eʋri:]	[eʋri]	[eʋri]	[eʋri]	[eʋri]	10	0
/æ/	act	[ækt]	[ækt]	[æktʰ]	[ækt]	[ækt]	[ækt]	[ækt]	[ækt]	[jækt]	[jækt]	3	0
/ə/	amount	[emɐunt]	[emɐunt]	[emɐuntʰ]	[emɐunt]	[emɐunt]	[emɐunt]	[emɐunt]	[emɐunt]	[emɐunt]	[emɐunt]	10	10
/ɜ:/	earnest	[e:nst]	[e:nest]	[ernest]	[ernest]	[e:nest]	[ɐrnest]	[ernest]	[e:nest]	[ernest]	[ernest]	10	10
/ʌ/	oven	[oʋen]	[oʋen]	[oʋen]	[oʋen]	[o:ʋen]	[oʋen]	[o:ʋen]	[o:ʋen]	[o:ʋen]	[ʋo:ʋen]	10	10
/ɒ/	honour	[ho:nɐ]	[ho:nɐ]	[ho:nɐr]	[ho:nɐr]	[o:nɐr]	[ho:nɐr]	[ho:nɐr]	[o:nɐr]	[ho:nɐr]	[ho:nɐr]	10	10
/ɔ:/	also	[ɐ:lso]	[ɐ:lso]	[ɐ:lso]	[ɐ:lso]	[o:lso]	[ɐ:lso:]	[ɐ:lso:]	[ɐ:lso]	[ɐ:lso]	[ɐ:lso]	10	10
/ʊ/	pull	[pul]	[pul]	[pul]	[pul]	[pul]	[pul]	[pul]	[pul]	[pul]	[pul]	10	10
/u:/	cool	[ku:l]	[ku:l]	[ku:l]	[ku:l]	[ku:l]	[ku:l]	[ku:l]	[ku:l]	[ku:l]	[ku:l]	0	0
/ɑ:/	calf	[kɐ:f]	[kɐ:f]	[kɐ:f]	[kɐf]	[kɐf]	[kɐ:lf]	[kɐ:f]	[kɐf]	[kɐf]	[kɐf]	10	10
/aɪ/	mice	[maɪs]	[maɪs]	[maɪs]	[maɪs]	[maɪs]	[maɪs]	[maɪs]	[maɪs]	[maɪs]	[maɪs]	0	0
/eɪ/	late	[le:t]	[le:t]	[le:tʰ]	[leɪt]	[le:t]	[le:t]	[leɪt]	[le:t]	[le:t]	[le:t]	8	8
/ɔɪ/	deploy	[diplo:j]	[diplo:j]	[diplo:j]	[diplo:j]	[diplo:j]	[diplo:j]	[diplo:j]	[diplo:j]	[diplo:j]	[diplo:j]	10	10
/aʊ/	allow	[ellou]	[elou]	[ɐlou]	[elou]	[elo]	[ello:]	[elo:]	[elo]	[elo]	[jelou]	10	10
/əʊ/	boat	[bo:t]	[bo:t]	[bo:tʰ]	[bo:t]	[bo:t]	[bo:t]	[bo:t]	[bo:t]	[bo:t]	[bo:t]	10	10
/ɪə/	fear	[fiə]	[fiə]	[fi:r]	[fijɐr]	[fjɐr]	[fijɐr]	[fijɐr]	[fijɐr]	[fijɐr]	[fijɐr]	10	10
/ʊə/	cure	[kju:r]	[kju:r]	[kju:r]	[kju:r]	[kjo:r]	[kju:r]	[kju:r]	[kjo:r]	[kju:r]	[kju:r]	10	10
/eə/	tare	[te:r]	[te:r]	[te:r]	[te:r]	[te:r]	[te:r]	[te:r]	[te:r]	[te:r]	[te:r]	10	10

In the pre-test, only 4 words, viz. seal, lime, cool and mice, are pronounced without any deviation and on the other 40 words were pronounced with deviations. Out of 40 words with deviation pronunciation, 31 words were pronounced with deviation by all the informants. Although the words were uttered with deviant pronunciation is large numbers, 90.90% to be

precise, the targeted phoneme was missing in 25 words which is to 43.18%. Actually, more of the targeted phonemes in the word list were pronounced properly but the words were not pronounced accurately.

Post-test results

English Phoneme	Word \ Audio	1	2	3	4	5	6	7	8	9	10	No of deviations	Target phoneme missing
	SNo	1	2	3	4	5	6	7	8	9	10		
		audio_1	audio_2	audio_3	audio_4	audio_5	audio_6	audio_7	audio_8	audio_9	audio_10		
/p/	pot	[pʰot]	[pʰot]	[pʰoːt]	[poːt]	[pot]	[potə]	[poːtʰ]	[pʰot]	[poːt]	[poː]	10	0
/b/	bull	[bul]	[bul]	[bul]	[bul]	[bul]	[bulə]	[bul]	[bul]	[bul]	[bul]	10	0
/t/	top	[tʰop]	[tʰop]	[tʰop]	[top]	[tʰop]	[toːpə]	[tʰoːp]	[tʰop]	[top]	[toːp]	10	0
/d/	dust	[dɐst]	[dɐst]	[dɐst]	[dɐst]	[dɐst]	[dɐst]	[dɐst]	[dɐst]	[dɐst]	[dɐst]	10	0
/k/	car	[kɐː]	[kɐː]	[kɐː]	[kɐː]	[kʰɐː]	[kɐːr]	[kʰɐː]	[kɐː]	[kɐː]	[kɐː]	10	0
/g/	gate	[geɪt]	[geɪt]	[geɪt]	[geɪt]	[geɪt]	[geːtʰ]	[geɪt]	[geɪt]	[geɪt]	[geɪt]	1	0
/tʃ/	chest	[ʨest]	[ʨest]	[ʨest]	[ʨest]	[ʨest]	[ʨest]	[ʨest]	[ʨest]	[ʨest]	[ʨest]	10	10
/dʒ/	jam	[dʑɐm]	[dʑɐm]	[dʑɐm]	[dʑɐm]	[dʑɐm]	[dʒɐm]	[dʑɐm]	[dʑɐm]	[dʑɐm]	[dʑɐm]	10	9
/m/	meal	[miːl]	[miːl]	[miːl]	[miːl]	[miːl]	[miːl]	[miːl]	[miːl]	[miːl]	[miːl]	0	0
/n/	nail	[neɪl]	[neɪl]	[neɪl]	[neɪl]	[neɪl]	[neɪlə]	[neɪl]	[neɪl]	[neɪl]	[neɪl]	1	0
/ŋ/	wing	[wɪŋ]	[ʋiŋ]	[ʋiŋ]	[wɪŋ]	[ʋiŋ]	[ʋiŋ]	[ʋiŋ]	[ʋiŋ]	[ʋiŋ]	[ʋiŋ]	8	0
/f/	fat	[fæt]	[fæt]	[fæt]	[fæt]	[fæt]	[fæt]	[fæt]	[fæt]	[fæt]	[fæt]	0	0
/v/	video	[vidioː]	[vidioː]	[viːdio]	[vidioː]	[viːdio]	[viːdioː]	[viːdijo]	[vidioː]	[viːdioː]	[viːdioː]	10	10
/θ/	thank	[θænk]	[θænk]	[t̪ʰænk]	[θænk]	[t̪ʰænk]	[t̪ænk]	[t̪ʰænk]	[θænk]	[t̪ʰænk]	[t̪ʰænk]	7	6
/ð/	this	[ðɪs]	[d̪is]	[d̪is]	[ðɪs]	[d̪is]	[d̪is]	[d̪is]	[ðɪs]	[ðɪs]	[d̪is]	6	6
/s/	see	[siː]	[siː]	[siː]	[siː]	[siː]	[siː]	[siː]	[siː]	[siː]	[siː]	0	0
/z/	zinc	[zɪŋk]	[zɪnk]	[zɪn]	[zɪŋk]	[zɪnk]	[zɪŋkʰ]	[dʒɪnk]	[zɪŋk]	[dʒɪnk]	[dʒɪnk]	7	3
/ʃ/	shine	[ʃaɪn]	[ʃaɪn]	[ʃaɪn]	[ʃaɪn]	[ʃaɪn]	[ʃɐɪjn]	[ʃaɪn]	[ʃaɪn]	[ʃaɪn]	[ʃaɪn]	1	0
/ʒ/	pleasure	[pleʒə]	[pleʃə]	[pleʒə]	[pleʒə]	[pleʒə]	[plezɐr]	[plezə]	[pleʒɜːr]	[pleʒər]	[pleʒɐː]	6	3
/r/	red	[red]	[red]	[red]	[red]	[red]	[redɐ]	[red]	[red]	[red]	[red]	1	0
/j/	yes	[jes]	[jes]	[jes]	[jes]	[es]	[jes]	[jɐs]	[jes]	[jes]	[jɐːs]	3	1
/w/	west	[vest]	[vest]	[veʃt]	[vest]	[vest]	[vest]	[vest]	[veʃ]	[vest]	[vest]	10	10
/l/	long	[loːŋ]	[loːŋ]	[loːŋ]	[loːŋ]	[loːŋ]	[loːŋ]	[loːŋ]	[loːŋ]	[loːŋ]	[loːŋ]	10	0
/h/	heat	[hiːt]	[hiːt]	[hiːt]	[hiːt]	[hiːt]	[hiːt]	[hiːt]	[hiːt]	[hiːt]	[hiːt]	0	0
/ɪ/	ink	[ɪŋk]	[iŋk]	[iŋk]	[iŋkʰ]	[iŋk]	[iŋkɐ]	[iŋk]	[iŋk]	[iŋk]	[iŋkɐ]	9	9
/iː/	even	[iːven]	[iːven]	[iːven]	[iːven]	[iːven]	[iːven]	[iven]	[iːven]	[iːven]	[iːven]	10	1
/e/	end	[end]	[end]	[end]	[end]	[end]	[endɐ]	[end]	[end]	[jend]	[endɐ]	3	0
/æ/	add	[æd]	[æd]	[æd]	[æd]	[æd]	[jɐd]	[jæd]	[jæd]	[æd]		3	1
/ə/	about	[ɐbɐut]	[ɐbɐut]	[eboːt]	[ɐbɐut]	[ɐbɐut]	[ɐbɐut]	[ɐbɐut]	[ɐbɐut]	[ɐbɐut]	[ɐbɐut]	10	10
/ɜː/	early	[ɜːli]	[ɜːli]	[erli]	[eːli]	[ɜːli]	[ɜːrliː]	[erli]	[jɜːrli]	[jerli]	[ɜːli]	10	4
/ʌ/	uncle	[ɐnkl]	[ɐnkul]	[ænkl]	[ɐnkl]	[ɐnkul]	[ɐnkul]	[ɐnkul]	[ɐnkul]	[ɐnkul]	[ɐnkul]	10	10
/ɒ/	ox	[oks]	[oːks]	[oks]	[oks]	[oks]	[ɒks]	[oːks]	[oks]	[oks]	[oks]	9	9
/ɔː/	order	[oːdə]	[oːdə]	[oːrdər]	[oːdɜː]	[oːdə]	[ɔːdər]	[oːrdər]	[oːdə]	[oːdə]	[oːdə]	10	9
/ʊ/	put	[put]	[put]	[put]	[put]	[put]	[put]	[fut]	[put]	[put]	[put]	10	10
/uː/	fool	[fuːl]	[fuːl]	[fuːl]	[fuːl]	[fuːl]	[fuːl]	[fuːl]	[fuːl]	[fuːl]	[fuːl]	0	0
/ɑː/	half	[hɐːf]	[hɐːf]	[hɐːf]	[hɐːf]	[hɐːf]	[hɑːf]	[ɐːf]	[hɐːf]	[hɐːf]	[hɐːf]	9	9
/aɪ/	rice	[raɪs]	[raɪs]	[reɪs]	[raɪs]	[reɪs]	[raɪs]	[raɪs]	[raɪs]	[rajis]		3	3
/eɪ/	gate	[geɪt]	[geɪt]	[geɪt]	[geɪt]	[geɪt]	[geɪt]	[geɪt]	[geɪt]	[geɪt]	[geːt]	1	1
/ɔɪ/	employ	[emploːj]	[emploːj]	[emploːj]	[emploːj]	[emploːj]	[emploːj]	[emploːj]	[emploːj]	[emploːj]	[emploːj]	10	10
/aʊ/	brow	[brau]	[brɐu]	[brou]	[brou]	[brɐu]	[broː]	[brɐu]	[brau]	[brou]	[brou]	10	10
/əʊ/	goat	[goːt]	[gɐut]	[goːt]	[goʔoːt]	[goːt]	[goːt]	[gɐut]	[goːt]	[goːt]	[goːt]	10	10
/ɪə/	dear	[dɪə]	[dɪə]	[dɪːr]	[dɪə]	[dɪə]	[diːr]	[diːr]	[dijər]	[dɪə]	[djə]	5	5
/ʊə/	sure	[ʃuə]	[ʃoː]	[ʃuːr]	[ʃuə]	[ʃoːr]	[ʃuːr]	[ʃuʋə]	[ʃoːr]	[ʃuə]	[ʃʋɐ]	10	10
/eə/	wear	[ʋeː]	[ʋeː]	[ʋiːr]	[ʋeːr]	[ʋer]	[ʋeːr]	[ʋer]	[ʋeːr]	[ʋeːr]	[ʋjɐ]	10	10

In the post-test, there is a very minimal increase in the number of words, that is 5 words, viz. meal, fat see, heat and fool, pronounced without any deviation and on the other 39 words were pronounced with deviations. Out of 39 words with deviation pronunciation, 21 words were pronounced with deviation by all the informants. Although the words were uttered with deviant pronunciation is large numbers, 88.63% to be precise, the targeted phoneme was missing in 27

words which is to 61.36%. Actually, more of the targeted phonemes in the word list were pronounced properly but the words were not pronounced accurately.

It appears that there is no great progress made from pre-test to post-test when individual words are checked for accurate pronunciation of word and sound production. However, when the overall result is observed, considerable progress was perceived. The details are given as follows.

Overall, out of a total of 440 words (44 phonemes of English produced 10 informants by reading words given in pre-test and post-test), there are 340 and 293 deviations in pronouncing the words given in the pre-test and post-test respectively. Also, the targeted phonemes are not pronounced 236 and 189 times the in pre-test and post-test respectively.

	No of deviations	Target phoneme missing
Pre-test	340	236
Post-test	293	189

Table 1: Overall results of pre-test and post-test

The following statements can be made with the overall results from Table 1.
1. In the pre-test, there is a deviation of 85% in pronouncing the words.
2. In the post-test, there is a deviation of 73.25% in pronouncing the words.
3. In the pre-test, the target phoneme is missed by 59%.
4. In the post-test, the target phoneme is missed by 47.25%.

Comparing the word pronunciation deviation results of the pre-test and post-test, we can clearly see that there was a marked improvement in the informants rendering. The difference in deviation was reduced to 11.75%. That is, from a deviation of 85% (pre-test) to 73.25% (post-test), which can be considered as a very significant improvement.

Similarly, comparing the results of the pre-test and post-test of the targeted phoneme, we can clearly see that there was a marked improvement in the informants rendering. The difference in deviation was reduced to 11.75%. That is, from a deviation of 59% (pre-test) to 47.25% (post-test), which can be considered as a very significant improvement.

Discussion

The diagnosis of the pre-test threw light on the problematic areas / problematic phonemes which were thoroughly dealt in the intervention study. The pre-test analysis helped in deciding he content for the intervention study. Upon conducting the post-test and analysing the results, comparing them with that of the pre-test results, it was clearly evident that the intervention study was found to be very effective.

Despite the fact that the intervention study proves to be effective, the study has the following limitations:

Limitations

- The analysis of the present study is limited to the data collected from the informants who are graduates.
- The study limits to segmental analysis of the informants' deviation in the pronunciation and progress made through the intervention study.

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- The study is limited to data collected from informants reading the pre-test and post-test but not speaking.
- The transcription of the pre-test and post-test word lists are done phonemically and collected data is transcribed confining to the 44 sounds of English. The only exception is aspiration for the sounds /p/, /t/, and /k/ of the stressed syllables in the initial position. This is because aspiration or its absence of these sounds can affect the intelligibility.
- Words like 'every' are transcribed as /evrɪ/ rather than /evri/ to confine to the 44 sounds of English. This is because it does not affect the intelligibility.

Recommendations
- Language teachers / instructors must be sure of the difference between the phonemes of English and the IPA.
- Including IPA chart in syllabus / course books would help teachers and students alike.
- Alternatively, the IPA chart can be introduced as supplementary material as well.

Usefulness of Interactive IPA Chart
- Using IPA chart in class gives confidence to students that they are learning from authentic resources.
- Using IPA chart ensures to minimise the individual differences of the sound production of teachers / instructors.
- Learning can be asynchronous when the online interactive IPA chart is used by students.
- IPA chart gives learner autonomy and individual pace of learning.

Conclusion

Owing to the increasing need for global communication, the demand for consistency and intelligibility, the reality of individual differences in sound production of the English language teachers, it is advantageous to have a tool like IPA chart which can address all the afore mentioned concerns and also provides standard output for auditory perception. This enhances the learning experience, also gives needed support to teachers and fills the necessary confidence among students while learning the sounds of English.

Acknowledgements

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