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ERRORS IN PRONOUNCING ENGLISH PHONEMES: A PRAAT ANALYSIS

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Abstract

This article is concerned with a study of pronunciation errors made by students of English Literature Department, Faculty of Cultural Sciences, University of Sumatera Utara. The scope is limited to the study of error analysis in the pronunciation of English phonemes. The participants of this study were two students of the department with Acehnese background. In this study, the electronic software called Praat was used as an instrument in the analysis of speech sounds of the participants. The purpose of this study was to find out the dominant errors of the pronunciation of English phonemes made by the participants. The data were derived from the pronunciations of English phonemes which were recorded and transcribed in the International Phonetic Alphabet (IPA) as in Katamba (1996: 13). The standard value of the pronunciation of English phonemes was adopted from Cambridge Advanced Learner's Dictionary. The quality of the pronunciations of the participants was described in graphs and the results were shown in percentage as given in tables and charts.

Keywords: phonology, articulatory phonetics, Praat software, inter-language.

1. Introduction

Linguistics is the study of language systems and all their aspects: how it is structured, how it is acquired, how it is used in the production and comprehension of messages. The part of linguistics that is concerned with the structure of language is divided into a number of subfields such as: phonology (the study of speech sounds in their cognitive aspects) phonetics (the study of speech sounds in their physical aspects), morphology (the study of the formation of words), syntax (the study of the formation of sentences), semantics (the study of meaning), and pragmatics (the study of language use) (Ogden, 2009).

This study focuses on the subfield of phonetics. It is a subfield of linguistics which focuses on how speech sounds are physically produced and received. In doing a speech act, human being needs to develop a language. Language is a purely human way to communicate ideas, emotions, and desires by means of voluntarily produced symbols. Thus, speech is important to express ideas and emotions. These symbols are represented in the study of phonetics, how speech sounds are produced, what the properties of speech sounds are, and how we perceive speech.

The study of phonetics has three aspects: acoustic phonetics, auditory phonetics, and articulatory phonetics. Acoustic phonetics is the study of acoustic characteristics of speech sounds, including analysis and descriptions of speech sounds. Auditory phonetics is the study

of physiological processes involved in the reception of speech sounds. Articulatory phonetics studies how speech sounds are produced by the organs of the vocal tract.

This study applies Praat software as it deals with acoustic aspects of speech sounds. Acoustic phonetics investigates time domain features such as the mean squared amplitude of a waveform, duration, fundamental frequency, and to abstract linguistic concepts such as phonemes, phrases or utterances. With acoustic phonetics, meaningful differences between phonemes, syllable, and words can be separated. Some aspects of speech sounds can be properly defined in acoustic terms. Therefore, the samples of this study were chosen from the students of English department of University of Sumatera Utara, who are originated from Acehnese ethnic group who have studied phonetics. The students who have passed phonetics subject are considered having enough knowledge to pronounce words in English correctly.

The purpose of this study was to find out the degree of pronunciation errors made by the participants. This study also aims at helping students understand that errors are actually the process before acquiring English like the pronunciation of the native speakers. This study was also expected to be useful to make phonology learning activities in the classroom more interesting and understandable for the students as the teachers can focus on teaching some words which are difficult to pronounce prior to those which are relatively easier so that the students can acquire the pronunciations of English phonemes perfectly.

2. Literature Review

The theoretical framework of this research is based on the theory of phonology proposed by Katamba (1996), particularly in the notion of phonemes and the International Phonetic Alphabets. Phonology is the branch of linguistics which investigates the ways in which sounds are used systematically in different languages to form words and utterances. Phonetics ias the study of the inventory of all speech sounds which humans are capable of producing (Katamba, 1996: 1). Phonemes refer to a family of sounds which count as the same in the language in question, which are functional (Katamba, 1996: 18). International Phonetics Alphabets (IPA) refer to the symbols conventionally used in phonology to transcribe speech sounds as in (Katamba, 1996: 13) and (Roach, 2008).

Earlier works and researches on phonology have been conducted by many linguists and researchers. Nilawati (2008) conducted a research entitled *The fossilized phones errors of the English Department students of Andalas University: An Interlanguage study*. She analyzes the accent of Bahasa Minang as interference to second language learning. There are 8 participants, who are English Department students, 4 with literature focus and 4 with linguistic focus. She picks the theory of Error Analysis and Inter language (Corder, 1985), and the theory of phonology (Katamba, 1989) and the theory of 'understand of fossilization' (Selinker, 1972) which becomes the references of IPA and recording. Nilawati prepares 42 words to be spoken and 15 questions for being analyzed further. This study is partially related to the present work as it is about analyzing pronunciation through an interview. Nilawati also used Praat software in her study. She held the interview with the sample using reading task. After that, the data was processed further by using Praat software. The result was then analyzed further to achieve the final result.

Another research related to the present study is published in the journal of the library of the University of Gajah Mada, Yogyakarta (i-lib, 2003) entitled *Interferensi Fonologi Bahasa Indonesia dalam Bahasa Perancis* 'Phonological Interference of Indonesian in French'. It explains about how the interference of mother language in second language learning. The

result of the study shows that each language has its own uniqueness. The interference happens especially in the pronunciation of phonemes which are not found in Bahasa Indonesia such as nasal phonemes. This study focused on phonological system, syllable structure and orthographic and pronunciation system. This work is related to the present study in the case of pronunciation analysis but it does not use Praat software as its tool to analyze the data from the students' pronunciation.

The next work was conducted by Kurniawan (2016) on error analysis of the pronunciation of dental fricative consonants (/θ/, /ð/) by students of English education study program Faculty of Teacher Training and Education, Sriwijaya University. He randomly took 120 students from the total of 240 students of the study program to be analyzed. Some students were asked to pronounce 30 words in which some of them were distracters but all of the words were recorded and then analyzed. A native speaker was involved in analyzing the errors. The results showed that pronunciation errors occurred when they pronounced alveolar stops /t/, and /d/. This study was really successful by involving a native speaker as the reference of standard pronunciation but the native speaker during this research was a bit different because the writer picked Google Gstatic pronunciation as the standard value of participants' pronunciation. Another difference was because this study focused only on the pronunciation of dental fricatives while the writer does a research for all English Phonemes.

3. Research Method

To deal with the problem, this research employs a descriptive qualitative approach. Moleong (2000) says that qualitative research often uses the quantitative data but it is generally not followed by quantitative analysis simultaneously. From the statement above, although the writer uses qualitative method, the quantitative data in numerical information is involved to describe the frequency, quantity, and intensity of the pronounced phonemes.

These steps are applied in researching the problem:

- The observation is done by downloading and recording the sound files.
- The result of the observation becomes the data which are then analyzed.
- The data are taken from native and non-native English speakers.
- The sound files are analyzed using Praat to find their acoustic features.
- Drawing the conclusion is the final point of the study.

The students majoring in English in the University of Sumatera Utara who had learned phonology were chosen as the participants of this study. Their ethnic background is Acehnese and they moved to Medan to continue their study in the university. The students also had finished their phonology class with minimum B grade and both of them were twenty years old and in the 6^{th} semester at the time when this research was being conducted.

In collecting the data, the writer used documentary technique through the observation. The data were collected by using a computer in the form of sound files. The writer chose recorded sounds from Cambridge Advanced Learner's Dictionary rather than from the native speaker manually because it was smoother, spending less time, energy and lower cost, and having English standard value of pronunciation.

The steps administered in collecting the data:

- The writer took the data of English native speaker's pronunciation from Cambridge Advanced Learner's Dictionary as the standard value of pronunciation.

- The word 'example' was replaced by the words that the writer wanted to analyze, then the sound file was recorded in mp3 format.
- The writer recorded the pronunciation of the participants and the participants read the word containing the focused phoneme one by one.
- The format of sound files from the dictionary and participants were changed into wav for the best quality, collected into folder, and then analyzed using Praat software.

The collected data were sorted to find every part of the task and questionnaire containing the particles observed in the research. To deal with the problem, the data from the reading task were transcribed and analyzed further by using Praat software to analyze, synthesize, and manipulate sounds, and also to discover the pitch realization.

Praat is a free computer software package for speech analysis in phonetics. It was designed, and continues to be developed, by Paul Boersma and David Weenink of the University of Amsterdam. It can run on a wide range of operating systems. The program supports speech synthesis, including articulatory synthesis (https://en.wikipedia.org/wiki/Praat).

The errors were determined by the result from Praat analysis in the form of the percentage and then the pronunciation value of the participants were compared with that of the native speaker in terms of such phonetic aspects as pitch, duration, and spectrum average value. The average value of the native speaker is considered as the standard value (100%). This sound file of the native speaker as adopted from Cambridge Advanced Learner's Dictionary was applied as the standard value and correct pronunciation in Praat software.

4. Results and Discussion

The result in this study is presented in tables and graphs, mostly the pronunciation value of the participants and that of the native speaker. This part consists of /ɪ/, /ʊ/, /e/, /ə/, /æ/, /ʌ/, and /ɒ/ phonemes. The result of Praat analysis is displayed in the table below.

Table 4.1 Pronounced English Short Vowels

Words	Focused Phoneme	Speaker	Frequency (Pitch)	Quantity (Duration)	Intensity (Spectrum)
Fish	/ɪ/	NS	199.3055784	0.1176190	80.6099988
		P1	248.3028882	0.1164399	68.8030532
		P2	249.7549003	0.1360544	75.8113738
Pull	/ʊ/	NS	138.0189223	0.1541950	84.3077656
		P1	238.0336763	0.0692517	75.0521416
		P2	266.7278423	0.0919501	74.6926275
Best	/e/	NS	160.0555586	0.0839682	79.1170257
		P1	187.5225529	0.0931519	66.9274354
		P2	221.9368334	0.1051927	70.7746172
About	/ə/	NS	185.5336266	0.0593650	80.8904046
		P1	218.2287761	0.0506802	62.6636115
		P2	241.6990386	0.0518594	69.7944276
Gas	/æ/	NS	126.6269865	0.2167573	79.1256161
		P1	182.7018937	0.1030839	69.5802465
		P2	240.8210777	0.1308163	76.4348458

Rush	/ʌ/	NS	179.8797036	0.1823582	79.1472336
		P1	202.0285300	0.1308390	71.2826087
		P2	234.3433910	0.1381179	79.5674276
Gone	/ɒ/	NS	129.9791799	0.1475736	83.4747627
		P1	204.1865726	0.1222222	70.1553709
		P2	232.40755504	0.1688888	75.5524223

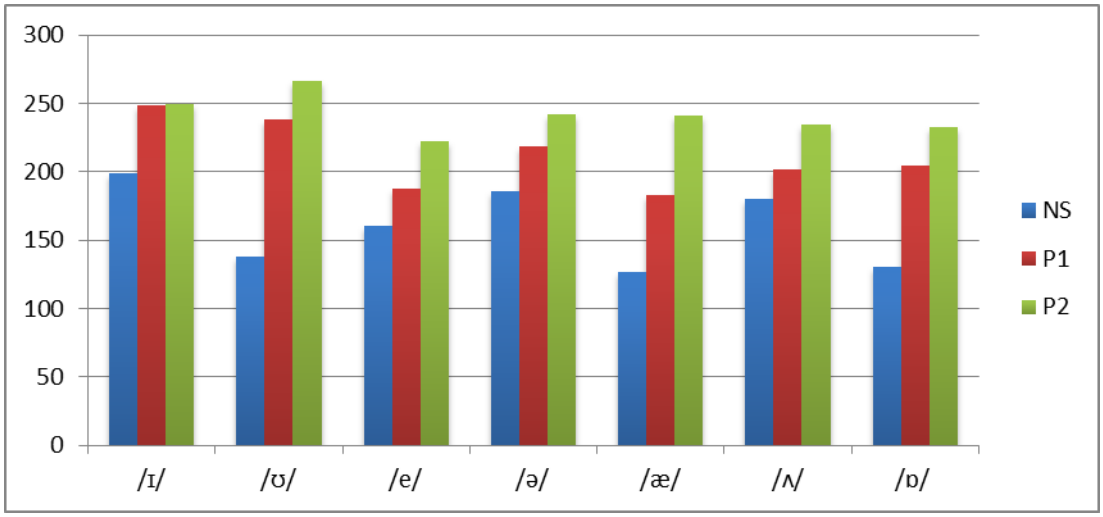

Figure 4.1
Comparative Chart of /ɪ/, /ʊ/, /e/, /ə/, /æ/, /ʌ/, and /ɒ/ pronounced phonemes Frequency (Pitch)

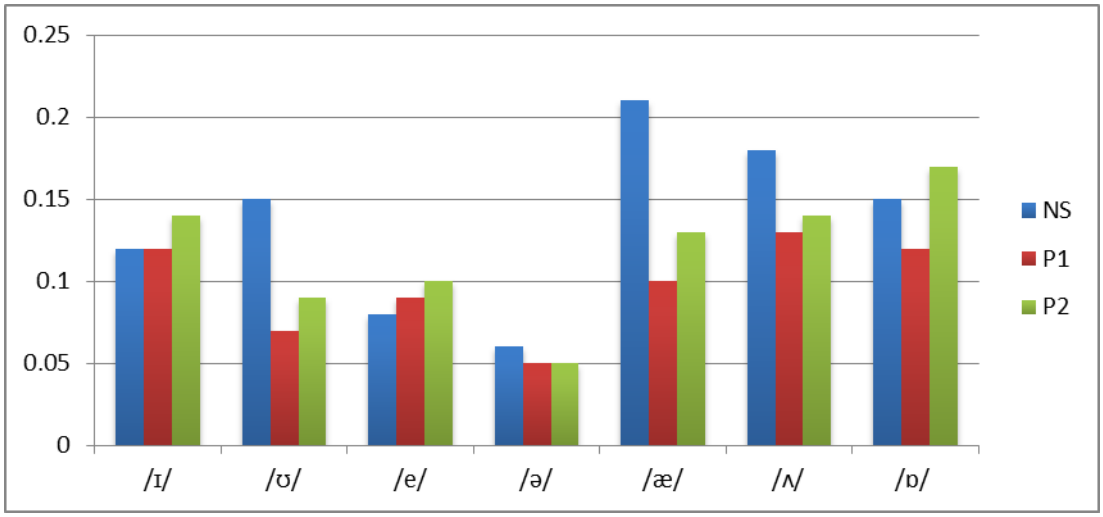

Figure 4.2
Comparative Chart of /ɪ/, /ʊ/, /e/, /ə/, /æ/, /ʌ/, and /ɒ/ pronounced phonemes Quantity (Duration)

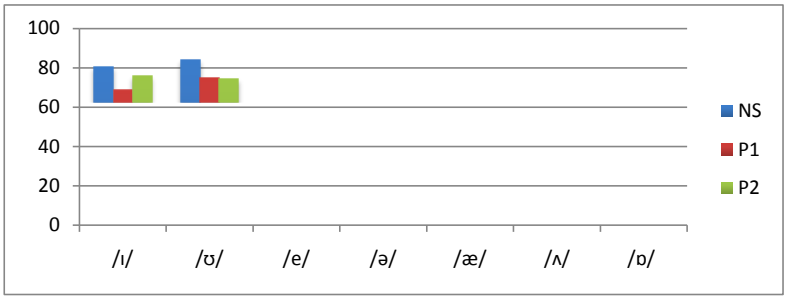

Figure 4.3
Comparative Chart of /ɪ/, /ʊ/, /e/, /ə/, /æ/, /ʌ/, and /ɒ/ pronounced phonemes Intensity (Spectrum)

Table 4.2
Pronounced English Long Vowels

Words	Focused Phoneme	Speaker	Frequency (Pitch)	Quantity (Duration)	Intensity (Spectrum)
Peace	/i:/	NS	125.1235731	0.1687074	79.9656268
		P1	221.7268693	0.1945351	72.0172887
		P2	244.5635391	0.1686167	70.6237845
Loose	/u:/	NS	134.9429003	0.1339682	85.5504862
		P1	217.7961049	0.1183900	74.2118378
		P2	247.5602112	0.1693197	79.1837637
Purse	/ɜ:/	NS	129.7685407	0.1991609	79.9246687
		P1	200.0378063	0.1935827	71.8306263
		P2	231.2872364	0.1910204	76.0491003
Board	/ɔ:/	NS	135.6118071	0.3082993	80.5989046
		P1	192.5357682	0.1540589	73.1297715
		P2	227.9374389	0.1031519	71.8681369
Card	/ɑ:/	NS	181.3596517	0.3423582	79.4231112
		P1	196.9557023	0.1723809	75.5345067
		P2	228.7128219	0.1582086	76.3766817

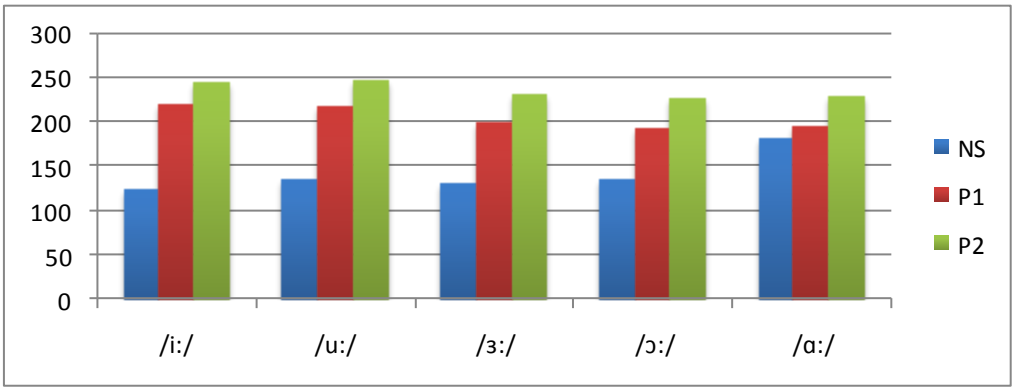

Figure 4.4
Comparative Chart of /i:/, /u:/, /e/, /ɜ:/, /ɔ:/, and /ɑ:/ pronounced phonemes Frequency (Pitch).

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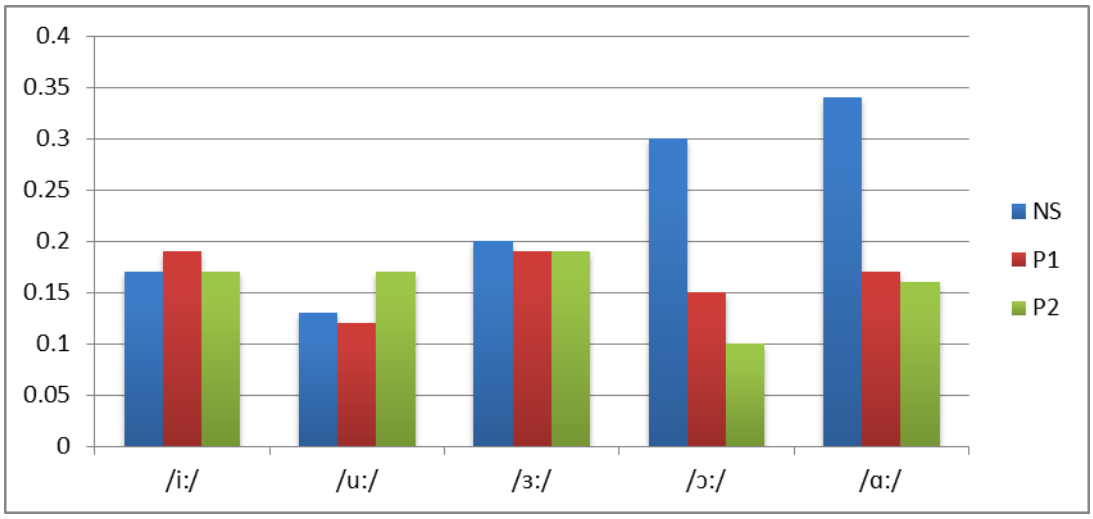

Figure 4.5
Comparative Chart of /i:/, /u:/, /e/, /ɜ:/, /ɔ:/, and /ɑ:/ pronunced phonemes Quantity (Duration).

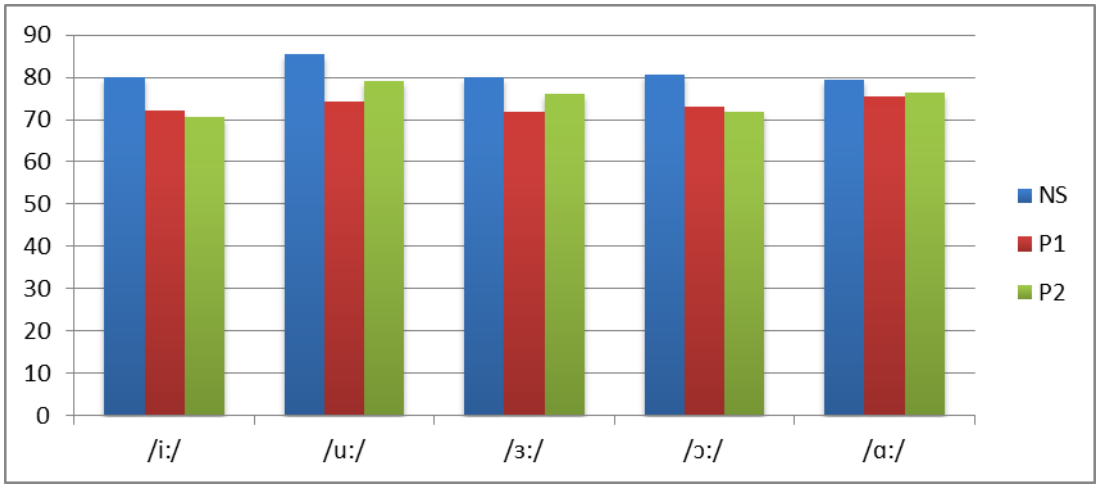

Figure 4.6
Comparative Chart of /i:/, /u:/, /e/, /ɜ:/, /ɔ:/, and /ɑ:/ pronounced phonemes Intensity (Spectrum)

Table 4.3 Pronounced English Diphthongs

Words	Focused Phoneme	Speaker	Frequency (Pitch)	Quantity (Duration)	Intensity (Spectrum)
Beard	/ɪə/	NS	143.6581892	0.2405668	80.0332756
		P1	206.4141379	0.1626757	74.4964311
		P2	228.8397334	0.1435374	75.6047077
Face	/eɪ/	NS	139.5285242	0.1337868	81.5470018
		P1	221.5433358	0.1841496	68.4517191
		P2	233.0899479	0.1870748	73.8632397
Tour	/ʊə/	NS	175.0336835	0.2383446	81.4429501
		P1	228.6960855	0.2069614	71.5874041
		P2	235.2231062	0.2204308	72.9050424

Voice	/ɔɪ/	NS	130.9559368	0.2116780	81.2437156
		P1	206.9275107	0.1972108	70.9962223
		P2	242.7422494	0.2041269	75.1438418
Home	/əʊ/	NS	146.2544160	0.1431292	83.7180472
		P1	216.6685880	0.1327664	74.8978918
		P2	247.3277399	0.1309977	76.4468057
Scarce	/eə/	NS	128.6710744	0.2606575	79.2718072
		P1	204.1208010	0.1977324	67.3742116
		P2	258.7629195	0.1609750	76.1914212
Time	/aɪ/	NS	135.3016691	0.2175510	83.4063538
		P1	213.2227340	0.2238548	72.6770321
		P2	231.2182619	0.2087528	73.0775257
Loud	/aʊ/	NS	123.9513831	0.2655782	77.4273393
		P1	188.1956915	0.1399319	70.4168189
		P2	220.4925342	0.2210430	75.8466901

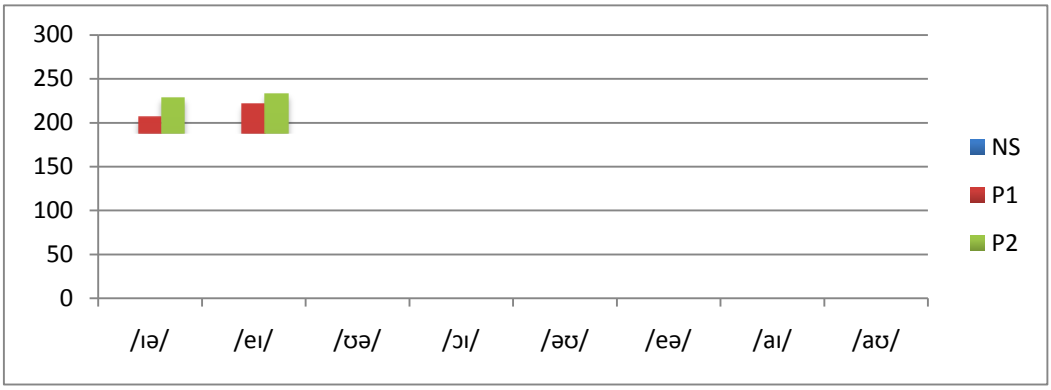

Figure 4.7
Comparative Chart of /ɪə/, /eɪ/, /ʊə/, /ɔɪ/, /əʊ/, /eə/, /aɪ/, and /aʊ/ pronounced phonemes Frequency (Pitch).

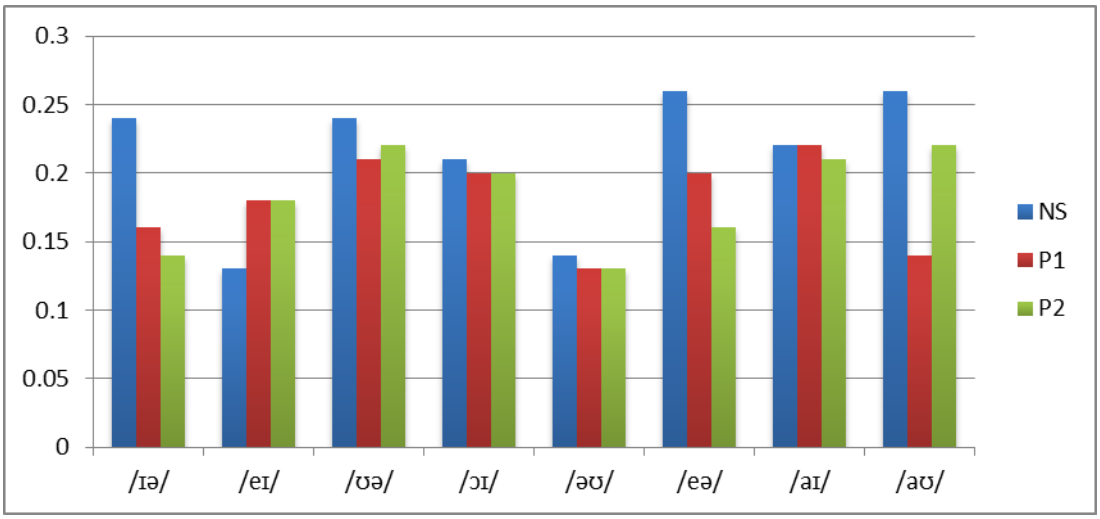

Figure 4.8
Comparative Chart of /ɪə/, /eɪ/, /ʊə/, /ɔɪ/, /əʊ/, /eə/, /aɪ/, and /aʊ/ pronounced phonemes Quantity (Duration)

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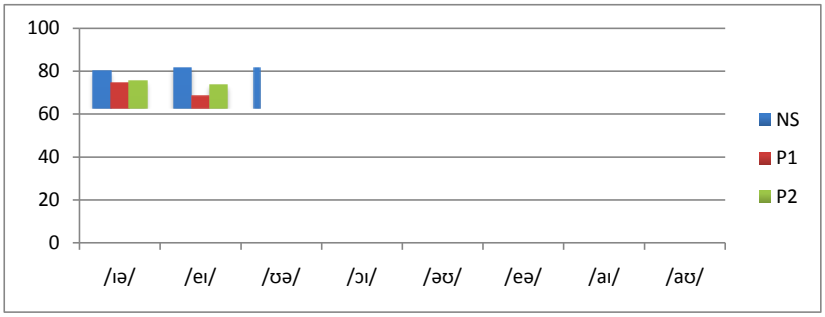

Figure 4.9
Comparative Chart of /ɪə/, /eɪ/, /ʊə/, /ɔɪ/, /əʊ/, /eə/, /aɪ/, and /aʊ/ pronounced phonemes Intensity (Spectrum)

Table 4.10 Pronounced English Triphthongs

Words	Focused Phoneme	Speaker	Frequency (Pitch)	Quantity (Duration)	Intensity (Spectrum)
Layer	/eɪə/	NS	177.9743725	0.3074376	79.4330650
		P1	200.8384674	0.3468934	68.3665787
		P2	244.2132866	0.3352380	75.3942525
Liar	/aɪə/	NS	180.7913466	0.2501360	78.5085299
		P1	200.4783038	0.3879365	69.1844105
		P2	231.6686971	0.3236507	76.0918328
Royal	/ɔɪə/	NS	183.2083471	0.3241269	81.7665817
		P1	200.3163959	0.2744217	68.3683304
		P2	249.5102718	0.3158276	77.9146459
Lower	/əʊə/	NS	170.3535340	0.2538775	78.0752508
		P1	215.7125501	0.2428571	71.4687629
		P2	238.2985780	0.3714058	76.4851962
Power	/aʊə/	NS	173.8672834	0.3476190	80.2162826
		P1	223.9827599	0.2601587	70.4867897
		P2	237.0149105	0.2808163	76.2742223

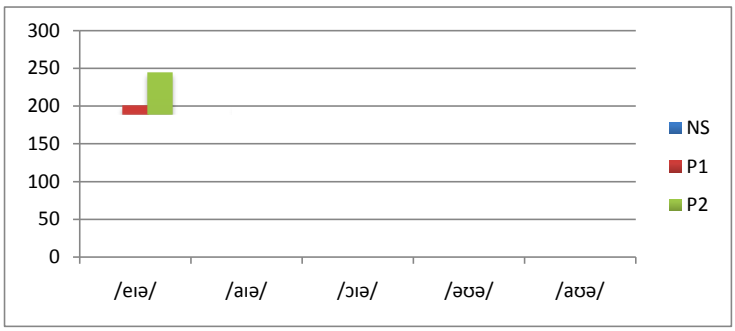

Figure 4.10
Comparative Chart of /eɪə/, /aɪə/, /ɔɪə/, /əʊə/, and /aʊə/ pronounced phonemes Frequency (Pitch).

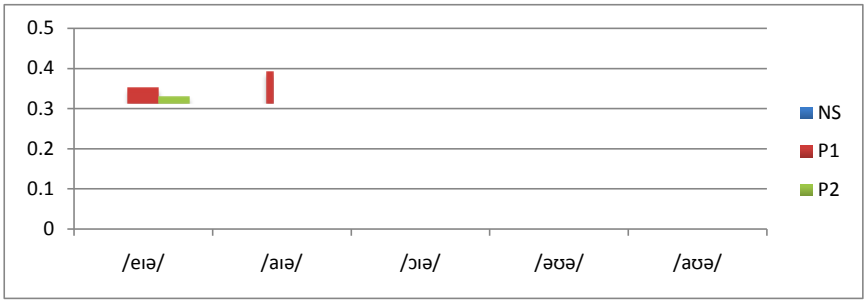

Figure 4.11
Comparative Chart of /eɪə/, /aɪə/, /ɔɪə/, /əʊə/, and /aʊə/ pronounced phonemes Quantity (Duration).

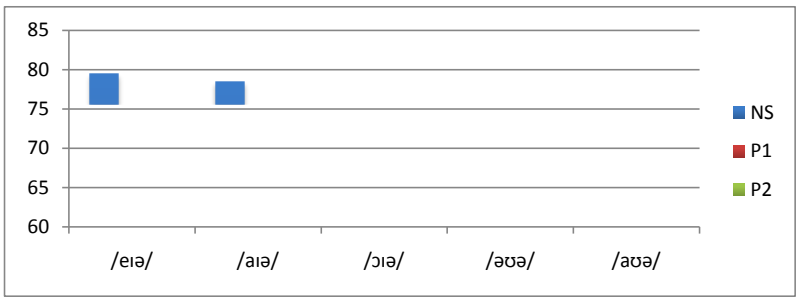

Figure 4.12
Comparative Chart of /eɪə/, /aɪə/, /ɔɪə/, /əʊə/, and /aʊə/ pronounced phonemes Intensity (Spectrum)

Table 4.5
Pronounced English Voiced Consonants

Words	Focused Phoneme	Speaker	Frequency (Pitch)	Quantity (Duration)	Intensity (Spectrum)
Ball	/b/	NS	142.0190310	0.0384126	80.4902777
		P1	197.0051919	0.1275056	63.2785110
		P2	224.9774747	0.1160090	63.3221333
Dog	/d/	NS	548.6544503	0.0194331	66.1037454
		P1	188.9661797	0.1294104	60.7780465
		P2	218.5419691	0.0886621	60.4339423
Joke	/ʤ/	NS	317.7665421	0.0649433	67.6260170
		P1	223.2543332	0.0897732	62.8682940
		P2	85.8210937	0.1092517	62.4381700
Good	/g/	NS	386.6681321	0.0261451	56.9652317
		P1	183.3045308	0.1278684	61.1951245
		P2	117.2616705	0.0955328	57.3303761
Van	/v/	NS	816.8996666	0.0580725	56.6712832
		P1	106.2296262	0.0703174	49.7500213

		P2	82.3251742	0.1008843	63.2379565
Father	/ð/	NS	163.6029011	0.0914739	55.1591239
		P1	197.1575835	0.1187528	55.8848908
		P2	258.6481177	0.0816326	59.1931969
Zip	/z/	NS	142.3905624	0.1070521	77.5744600
		P1	184.3538143	0.1821088	62.6994806
		P2	124.2957748	0.1187528	67.9363752
Measure	/ʒ/	NS	168.4574086	0.1010430	70.2525075
		P1	195.1559060	0.1349659	62.8181926
		P2	127.0967443	0.0898866	69.0725068
Mouth	/m/	NS	144.9547490	0.0706122	75.8811390
		P1	208.7318441	0.0809750	68.6478201
		P2	252.2413731	0.0831972	66.8093397
Nothing	/n/	NS	141.2716999	0.0646031	73.0558055
		P1	105.3213255	0.1224943	65.7888466
		P2	261.1503793	0.0851247	70.2147828
Sing	/ŋ/	NS	122.0032681	0.2002040	71.6309167
		P1	177.3683848	0.3697278	61.0053751
		P2	106.4999278	0.1691156	66.6099851
Love	/l/	NS	143.9455229	0.0626077	79.1297765
		P1	208.8140675	0.0884580	59.1844073
		P2	240.6561522	0.0912244	66.1799387
Red	/r/	NS	95.9571633	0.1173242	76.4888507
		P1	185.7829578	0.1137414	61.8773646
		P2	123.5727384	0.0829931	65.2957593
Witch	/w/	NS	150.3407784	0.0477097	83.0318542
		P1	206.8665780	0.1190702	65.5268053
		P2	249.2914686	0.0680952	64.9178881
Yes	/j/	NS	193.9523486	0.1235827	78.7804051
		P1	210.4515144	0.0675736	64.7903915
		P2	247.1797304	0.1100453	67.6117301

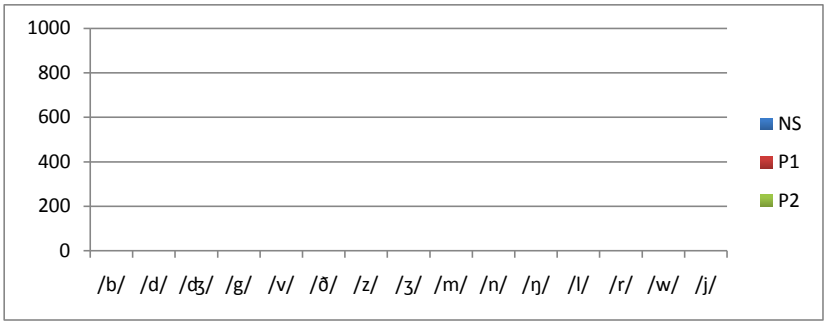

Figure 4.13
Comparative Chart of /b/, /d/, /ʤ/, /g/, /v/, /ð/, /z/, /ʒ/, /m/, /n/, /ŋ/, /l/, /r/, /w/,and /j/ pronounced phonemes Frequency (Pitch)

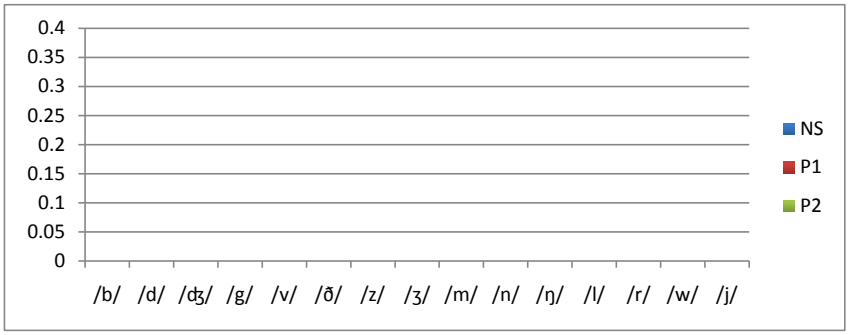

Figure 4.14
Comparative Chart of /b/, /d/, /ʤ/, /g/, /v/, /ð/, /z/, /ʒ/, /m/, /n/, /ŋ/, /l/, /r/, /w/,and /j/ pronounced phonemes Quantity (Duration)

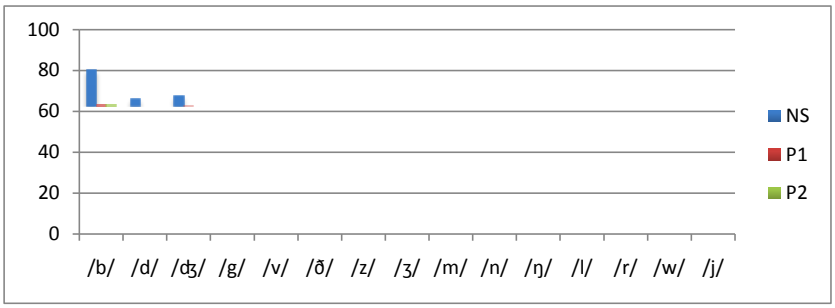

Figure 4.15
Comparative Chart of /b/, /d/, /ʤ/, /g/, /v/, /ð/, /z/, /ʒ/, /m/, /n/, /ŋ/, /l/, /r/, /w/,and /j/ pronounced phonemes Intensity (Spectrum)

4.6 Pronounced English Voiceless Consonants

Words	Focused Phoneme	Speaker	Frequency (Pitch)	Quantity (Duration)	Intensity (Spectrum)
Pea	/p/	NS	438.0859259	0.0478684	59.0593833
		P1	209.5659509	0.0425396	68.9877762
		P2	280.9217014	0.0480952	66.7773536
Tea	/t/	NS	454.4883474	0.0762131	69.7431705
		P1	229.1721206	0.0419274	61.6244638
		P2	183.8807165	0.0620861	57.9109610
Nature	/ʧ/	NS	219.0441825	0.1128798	71.3044893
		P1	221.9069718	0.1265986	66.9267995
		P2	452.8307220	0.0665759	68.2111688
Coffee	/k/	NS	421.1288441	0.0600453	57.6402177
		P1	288.8670563	0.0398412	60.2988311
		P2	501.8464336	0.0494104	60.0795973
Fan	/f/	NS	312.7676220	0.0894784	56.8550984

		P1	197.1575835	0.1187528	55.8848908
		P2	421.0557913	0.1376190	71.1938704
Thumb	/θ/	NS	482.3518872	0.1365306	58.0026577
		P1	2160.4670428	0.1728571	55.2341428
		P2	121.7426010	0.0809297	56.3006397
Facing	/s/	NS	233.0346168	0.1449659	75.8341821
		P1	239.3403475	0.1840589	71.9209567
		P2	96.4129415	0.1400226	72.4158887
Ship	/ʃ/	NS	316.2145589	0.1596371	70.9223151
		P1	491.5341962	0.2515873	74.8917669
		P2	178.1640505	0.1481859	68.6016945
Ahead	/h/	NS	339.4688525	0.1340136	64.8746212
		P1	126.7776866	0.1360770	61.4045972
		P2	114.9191008	0.1407482	64.6725592

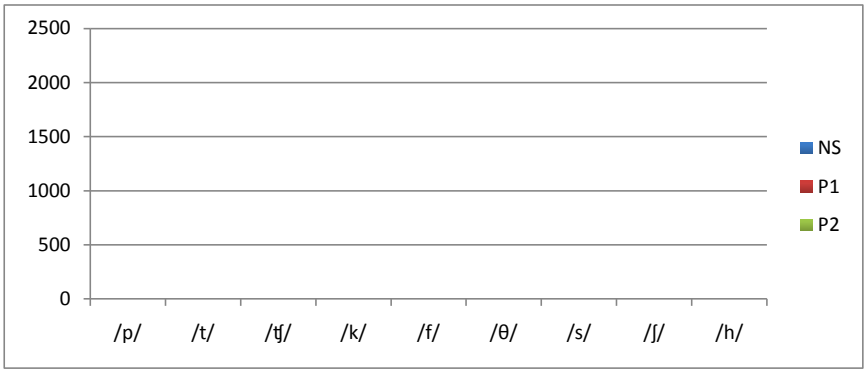

Figure 4.16
Comparative Chart of /p/, /t/, /ʧ/, /k/, /f/, /θ/, /s/, / ʃ /, and /h/ pronounced phonemes Frequency (Pitch)

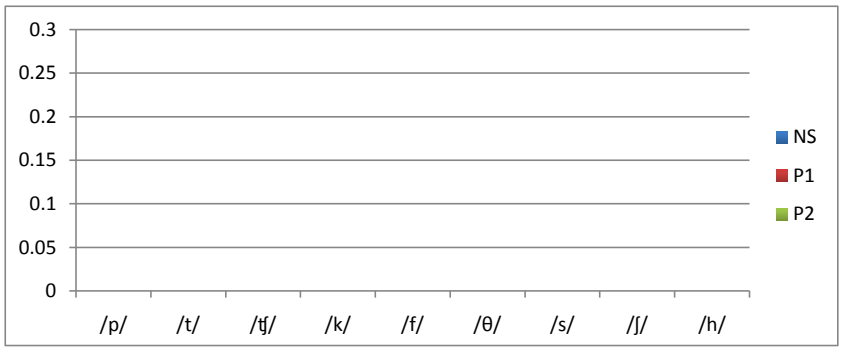

Figure 4.17
Comparative Chart of /p/, /t/, /ʧ/, /k/, /f/, /θ/, /s/, / ʃ /, and /h/ pronounced phonemes Quantity (Duration)

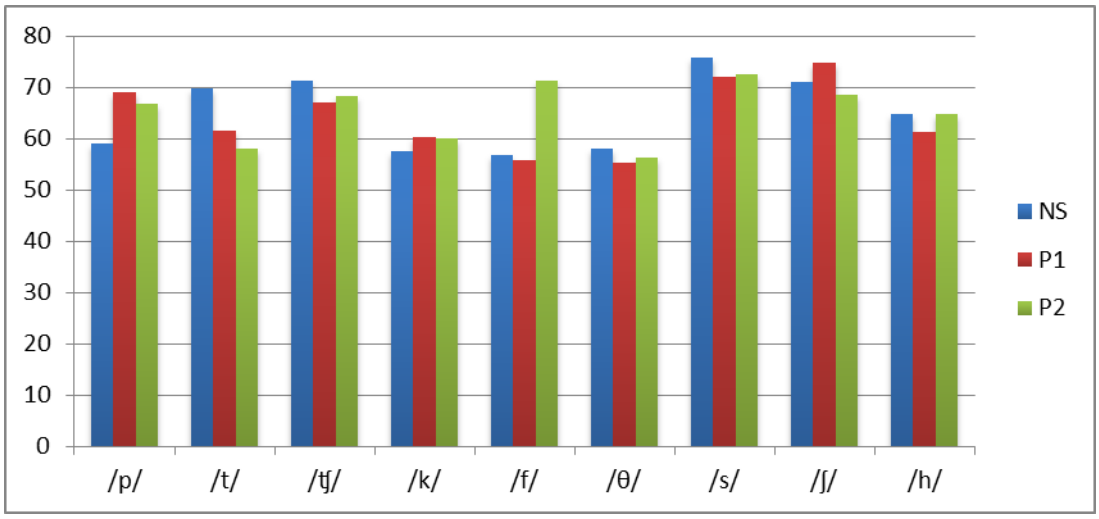

Figure 4.18
Comparative Chart of /p/, /t/, /ʧ/, /k/, /f/, /θ/, /s/, / ʃ /, and /h/ pronounced phonemes Intensity (Spectrum)

To compare the participants' pronunciation value in percentage, the Native Speaker's pronunciation is considered 100% correct. This value is not a maximal value as the value of the participants' acoustic terms varies in number. It could be lower than the native speaker or higher but this value is the standard. If the participants' pronunciation value is less than 100%, it is considered as low and vice versa.

To judge the participants' errors, the researcher took each value to be compared with the native speaker's value in the range between the participants' pronunciation and the native speaker's pronunciation. If the range of the participants' pronunciation is wider, it means that the errors are higher. The errors are sorted from high to low.

P1: /d/ (158.79%), /θ/ (121.52%), /g/ (96.05%), /b/ (80.78%), /w/ (51.96%), /ʃ/ (39.09%), /ŋ/ (38.51%), /t/ (37.07%), /v/ (27.51%), /aɪ/ (27.06%), /m/ (26.25%), /z/ (24.65%), /l/ (23.28%), /r/ (22.05%), /n/ (21.54%), /n/ (20.04%), /p/ (18.57%), /ð/ (18.38%), /aɪə/ (18.34%), /j/ (16.97%), /h/ (16.37%), /ɑ:/ (15.43%), /aɪ/ (14.91%), /ɔɪ/ (13.55%), /u:/ (13.48%), /ɜ:/ (13.01%), /ʒ/ (11.75%), /əʊ/ (10.16%), /ʌ/ (8.47%), /i:/ (8.01%), /ɔɪə/ (7.56%), /æ/ (7.45%), /ə/ (7.15%), /ɒ/ (7.04%), /eə/ (6.85%), /s/ (6.33%), /ɔ:/ (6.31%), /e/ (4.75%), /əʊə/ (4.73%), /ʧ/ (4.45%), /ʤ/ (4.40%), /ʊ/ (4.05%), /eɪə/ (3.94%), /ɪ/ (3.31%), /aʊə/ (3.01%), /ʊə/ (2.02%), /f/ (1.78%), /ɪə/ (1.15%), /aʊ/ (1.12%).

P2: /d/ (93.75%), /b/ (79.03%), /w/ (44.27%), /g/ (43.66%), /θ/ (40.18%), /f/ (38.47), /n/ (38.10), /u:/ (35.59), /s/ (35.33), /eɪ/ (34.96), /t/ (33.83), /l/ (33.61), /əʊə/ (28.28), /i:/ (27.93), /ɒ/ (27.55), /m/ (25.47), /ɔɪ/ (24.37), /ɜ:/ (22.79), /ʧ/ (22.01), /aʊ/ (20.15), /h/ (19.59), /eə/ (19.58), /ð/ (18.09), /aɪ/ (17.98), /əʊ/ (17.76), /ʃ/ (17.73), /e/ (17.70), /aɪə/ (17.69), /ʊ/ (13.66), /eɪə/ (12.86), /ʒ/ (12.08), /ɪ/ (12.01), /ŋ/ (11.57), /ɑ:/ (10.22), /ɔɪə/ (9.45), /p/ (7.61), /r/ (6.40), /z/ (5.35), /æ/ (5.29), /ʊə/ (5.19), /ɪə/ (4.03), /v/ (3.89), /aʊə/ (3.79), /ɔ:/ (3.47), /ʌ/ (2.86), /n/ (2.24), /j/ (1.64), /ʤ/ (0.89), /ə/ (0.04).

5. Conclusion

The conclusion comes from the data analysis and findings in the previous chapter. The first purpose is to show the incorrect participants' pronunciation of phonemes in graphic charts and percentage tables. The data for graphic charts and percentage tables come from Praat software. This software synthesizes the students' pronunciation in sound wave and it

comes along with the value. This value is then extracted in charts and compared with the native speaker's pronunciation value. The result shows that no participants pronounce English phonemes correctly or 0% range value. Finally, the participants' pronunciation is analyzed from the value of the pitch, duration, and spectrum by using Praat software. The value of each phoneme is then summed up and divided by three to find the average value. The average value of correct pronunciation of English phonemes is 100%.

It was also found that Praat software is very helpful in doing this research, but the researcher also had hard times to learn and develop knowledge of how to run this software at the first time. So the researcher suggests that students in the department of English need to learn how to use this software to help them do significant phonetic research in future.

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