CHAPTER IV

RESEARCH FINDING AND DISCUSSION

In this chapter, researcher would like to present the finding and discussion of research. The data collected through documentation that has been discussed in previous chapter. This chapter includes the vowel formant values and vowel quality of the 8th semester of English department student.

A. Finding of Research

1. The Vowel Formant Values Spoken by the 8th Semester of English Department of State Islamic Institute of Madura

In this part, the researcher presents the result of vowel formant values produced by English department students. The value of this formant is gotten from software, namely Praat. College students' pronunciations that have been recorded are inputted to Praat. It would show the formant value of the vowel sound. The formant value of vowel sound could be seen the lowest frequency called formant one and formant two.

There are four kinds of vowel sounds, [i], [ɪ], [ɛ], [æ], produced by twenty participants from the 8th semester of English department of State Islamic Institute of Madura. The vowel sound of [i] is from word "peach", the vowel sound of [ɪ] is from word "pitch", the vowel sound of [ɛ] is from word "head", and the vowel sound of [æ] is from word "had".

The researcher inputs the data about formant value of the 8th semester of English department of State Islamic Institute of Madura into table. The

table below displays the formant value especially the formant one (F1) and formant two (F2) of four English vowel sounds.

Table 4.1 The result of formant value produced by the 8th semester of English department of State Islamic Institute of Madura.

***the speakers' name are indicated in the initial to protect the speakers' privacy**

No	Speakers	F	Formant Value (Hz)			
			[i]	[ɪ]	[ɛ]	[æ]
1.	NF	F1	380	531	807	907
		F2	2789	2488	2212	2087
2.	KA	F1	406	531	807	782
		F2	3015	2914	2162	2287
3	NFM	F1	481	380	681	832
		F2	2939	732	2488	1682
4	ML	F1	380	431	631	631
		F2	3115	2939	2563	2337
5	NL	F1	380	431	606	732
		F2	2839	2739	2714	1460
6	RH	F1	406	531	807	907
		F2	2011	3065	1710	1635
7	AM	F1	431	531	431	882
		F2	2990	1309	2939	1836
8	MSF	F1	406	531	631	807
		F2	2889	2287	2036	2011
9	KAY	F1	380	406	531	757
		F2	2613	2764	2789	2162
10	IN	F1	380	406	982	1234

		F2	2689	2864	2287	2162
11	AF	F1	406	556	636	631
		F2	2664	2287	1861	2538
12	ADM	F1	380	406	631	782
		F2	2237	1911	1836	1811
13	HM	F1	380	406	656	832
		F2	2337	2363	2137	1836
14	AR	F1	380	531	581	807
		F2	2513	2212	2337	1660
15	ASR	F1	380	380	606	807
		F2	2438	2337	2237	1811
16	SA	F1	406	531	656	807
		F2	2287	2388	1836	1660
17	UH	F1	506	556	681	1083
		F2	3040	2262	2187	1485
18	AFD	F1	406	431	556	656
		F2	3040	3040	2538	1961
19	DAP	F1	506	456	531	832
		F2	2638	2939	2965	2463
20	AS	F1	380	406	606	681
		F2	2488	2312	2187	1961

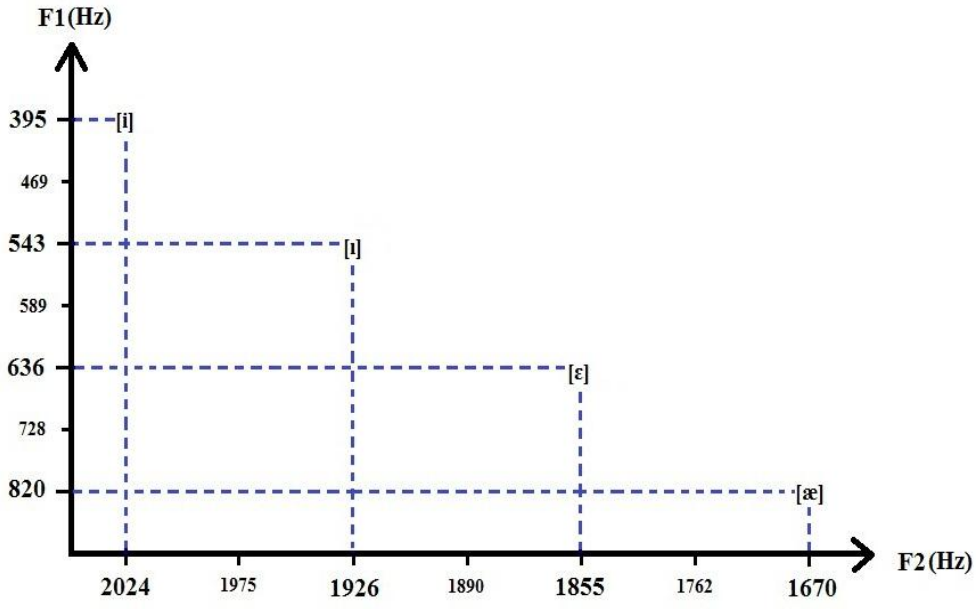
Those are the results of formant values of the 8th Semester of English Department of State Islamic Institute of Madura that have been done by using Praat software. Those results of formant values would be analyzed and discussed based on English native speaker's formant value.

2. The Vowel Quality of the 8th Semester of English Department of State Islamic Institute of Madura Based on English Native Speaker Formant Value

This part is about the results of the vowel quality of the 8th semester of English department of State Islamic Institute of Madura based on English native speaker formant value. There are ten speakers that would be discussed. The discussion is about the tongue height and the tongue advancement dimension (frontness and backness of tongue) by analyzing the formant one (F1) and formant two (F2).

Based on this fact, the vowel quality has big relation with formant value. This figure shows the position of formant values produced by English native speaker.

Picture 4.1 The position of vowel formant values produced by English native speaker.



Then, these are the discussion about the tongue height and tongue advancement produced by the speakers of the 8th semester of English department of State Islamic Institute of Madura based on English native speaker formant value.

a. The Vowel Quality of Speaker NF

Table 4.2 The comparison of formant value between speaker NF and English native speaker.

Vowel Sound	Speaker 1 (NF)		English Native Speaker	
	F1	**F2**	**F1**	**F2**
[i]	380	2789	395	2024
[ɪ]	531	2488	543	1926
[ɛ]	807	2212	636	1855
[æ]	907	2087	820	1670

Based on the table above, it is known that the formant one for the vowel sound [i], NF produces it in 380 Hz while the English native speaker produces it in 395 Hz. The formant one value of vowel sound [i] produced by NF and English native speaker is nearly same. The difference is only 15 Hz. According to Ogden's theory, formant one relates to tongue height. Therefore, it could be concluded that NF's tongue height for vowel sound [i] is good enough.

Then, NF produces 2789 Hz and the English native speaker produces 2024 Hz for the formant two of vowel sound [i]. It is known that the difference formant one of vowel sound [i] produced by these two speakers is large. NF's formant two of vowel sound [i] is higher than English native speaker. Formant two relates to the frontness and the

backness of tongue (advancement dimension of tongue), then the more forward the position of tongue means the higher formant two. Based on this condition, NF's tongue position is more forward than English native speaker. Therefore, it could be concluded that NF's tongue advancement in pronouncing vowel sound [i] is not good enough.

NF produces 531 Hz while English native speaker produces 543 Hz for the formant one of vowel sound [ɪ]. It is known that the formant one of vowel sound [ɪ] produced by NF is nearly same with English native speaker where the difference is only 12 Hz. Since formant one relates to the tongue height, it could be concluded that NF's tongue height in pronouncing vowel sound [ɪ] is already good enough.

For the formant two of vowel sound [ɪ], NF produces it in 2488 Hz and English native speaker produces it in 1926 Hz. It is known that NF's formant two of vowel sound [ɪ] is higher than English native speaker. Based on this condition, NF's tongue position in pronouncing vowel sound [ɪ] is more forward than English native speaker. Therefore, it could be concluded that NF's tongue advancement in pronouncing vowel sound [i] is not good enough.

For the formant one of vowel sound [ɛ], NF produces it in 807 Hz and English native speaker produces it in 636 Hz. From this statement, it could be concluded that the formant one of vowel sound [ɛ] between NF and English native speaker has large difference. Besides, NF produced the formant one of [ɛ] nearly same with [æ] which is produced by English native speaker in 820 Hz. Formant one relates to the vowel

height. The higher F1 means the lower tongue position. Therefore, NF's tongue height position in pronouncing vowel sound [ɛ] is lower than English native speaker and causes her tongue height position to be nearly same as vowel sound [æ] produced by English native speaker. In summary, NF's tongue height position in pronouncing vowel sound [ɛ] is not good enough because her tongue height position of vowel sound [ɛ] is nearly same with the vowel sound [æ] produced by English native speaker.

In addition, NF produces 2212 Hz and the English native speaker produces 1855 Hz for the formant two of vowel sound [ɛ]. It is known that NF's formant two of vowel sound [ɛ] is higher than English native speaker. Based on this condition, NF's tongue position in pronouncing vowel sound [ɛ] is more forward than English native speaker. Therefore, it could be concluded that NF's tongue advancement in pronouncing vowel sound [ɛ] is not good enough.

For the formant one of vowel sound [æ], NF produces it in 907 Hz and English native speaker produces it in 820 Hz. It is known that the formant one of vowel sound [æ] produced by NF is higher than English native speaker and has large difference. According to Ogden's theory, NF's tongue height position in pronouncing vowel sound [æ] is lower than English native speaker.

Then, for the formant two of vowel sound [æ], NF produces it in 2087 Hz and English native speaker produces it in 1670 Hz. The difference of formant two of vowel sound [æ] between these two

speakers is large. Because the Formant two of the vowel sound [æ] produced by NF is higher than English native speaker, so NF's tongue position in pronouncing vowel sound [æ] is more forward than English native speaker. Based on this fact, it could be concluded that NF's tongue advancement in pronouncing vowel sound [æ] is not good enough.

b. The Vowel Quality of Speaker KA

Table 4.3 The comparison of formant value between speaker KA and English native speaker.

Vowel Sound	Speaker 2 (KA)		English Native Speaker	
	F1	**F2**	**F1**	**F2**
[i]	406	3015	395	2024
[ɪ]	531	2914	543	1926
[ɛ]	807	2162	636	1855
[æ]	782	2287	820	1670

Based on the table above, it is known that KA produced 406 Hz and native speaker produced 395 Hz for the formant one of vowel sound [i]. The formant one of vowel sound [i] between these two speakers is nearly same with difference only 9 Hz. According to Ogden's theory that F1 relates to tongue height, so it could be concluded that KA's tongue height in pronouncing vowel sound [i] is good enough.

Then, KA produces 3015 Hz and English native speaker produces 2024 Hz for the formant two of vowel sound [i]. It is known that the difference between these two speakers is large. KA produces the formant

two of vowel sound [i] higher than the English native speaker. Formant two is related to the frontness and the backness of tongue (advancement dimension of tongue). The more forward the position of tongue means the higher formant two. Because of that, it could be concluded that KA's the tongue advancement in pronouncing vowel sound [i] is not good enough because her tongue position is much more forward than English native speaker.

For the formant one of vowel sound [ɪ], KA produces it in 531 Hz and English native speaker produces it in 543 Hz. The difference formant one of vowel sound [ɪ] between these two speakers is not large where the difference is just 12 Hz. Therefore, it could be concluded that KA's tongue height position in pronouncing vowel sound [ɪ] is good enough.

Besides, KA produces 2914 Hz and English native speaker produces 1926 for the formant two of vowel sound [ɪ]. It is known that there is large difference between these two speakers where KA's formant two of vowel sound [ɪ] is higher than English native speaker. Therefore, it could be concluded that KA's tongue advancement in pronouncing vowel sound [ɪ] is not good enough because her tongue position is more forward than English native speaker.

Next, KA produces 807 Hz and English native speaker produces 636 Hz for the formant one of vowel sound [ɛ]. Formant one relates to the vowel height. The higher formant one means the lower tongue position. Based on this condition, the position of KA's tongue in pronouncing vowel sound [ɛ] is too low. It is also known that the formant

one of vowel sound [ɛ] produces by KA is closer to formant one of vowel sound [æ] produced by English native speaker, that is 820 Hz. The difference is only 13 Hz. So, it could be concluded that KA's tongue height position in pronouncing vowel sound [ɛ] is not good enough because her tongue height position of vowel sound [ɛ] is nearly same with the vowel sound [æ] of English native speaker.

For the formant two of vowel sound [ɛ], KA produces it in 2162 Hz while English native speaker produces it in 1855 Hz. Because the formant two of vowel sound [ɛ] produces by KA is higher than English native speaker, so it could be concluded that KA's tongue advancement of vowel sound [ɛ] is not good enough because her tongue position is more forward than English native speaker.

Furthermore, KA produces the formant one of vowel sound [æ] in 782 Hz while English native speaker produces it in 820 Hz. It is known that KA's formant one of vowel sound [æ] is lower than English native speaker. The difference is 38 Hz. However, it still in the range of vowel sound [æ]. Therefore, it could be concluded that KA's tongue position in pronouncing vowel sound [æ] is good enough even though the tongue height position is a bit higher than English native speaker.

Then, KA produces 2287 Hz and English native speaker produces 1670 Hz for the formant two of vowel sound [æ]. The formant two of vowel sound [æ] produced by KA is higher than English native speaker, so it could be concluded that KA's tongue advancement is not good

enough because her tongue position is more forward than English native speaker.

c. The Vowel Quality of Speaker NFM

Table 4.4 The comparison of formant value between speaker NFM and English native speaker.

Vowel Sound	Speaker 3 (NFM)		English Native Speaker	
	F1	**F2**	**F1**	**F2**
[i]	481	2939	395	2024
[ɪ]	380	732	543	1926
[ɛ]	681	2488	636	1855
[æ]	832	1682	820	1670

Based on the table above, NFM produces 482 Hz and English native speaker produces 395 Hz for the formant one of vowel sound [i]. The formant one of vowel sound [i] produces by NFM is higher than English native speaker. Besides, the formant one of vowel sound [i] produces by NFM is closer to the formant one of vowel sound [ɪ] of English native speaker which has frequency 543 Hz. Formant one relates to the vowel height. The higher formant one means the lower tongue position. Therefore, the position of NFM's tongue in pronouncing vowel sound [i] is too low and causes her tongue height position to be nearly same as vowel sound [ɪ] produced by English native speaker. So, it could be concluded that NFM's tongue height position in pronouncing vowel sound [i] is not good enough because her tongue height position of vowel sound [i] is nearly same with the vowel sound [ɪ] of English native speaker.

NFM produces 2939 Hz and English native speaker produces 2021 Hz for the formant two of vowel sound [i]. It is known that the formant two of vowel sound [i] produced by NFM is higher than English native speaker. Formant two is related to the frontness and the backness of tongue. Then, the more forward the position of tongue means the higher formant two. Therefore, it could be concluded that NFM's tongue advancement is not good enough because her tongue position more forward than English native speaker's tongue.

Then, NFM produces 380 Hz and English native speaker produces 543 Hz for the formant one of vowel sound [ɪ]. It is known that the formant one of vowel [ɪ] produced by NFM is closer to the formant one of vowel sound [i] produced by English native speaker which has a frequency of 395 Hz. The difference is only 15 Hz. It is known that NFM's tongue height for the vowel sound [ɪ] is too high and causes her tongue height position to be nearly same as vowel sound [i] produced by English native speaker. So, it could be concluded that NFM's tongue height position in pronouncing vowel sound [ɪ] is not good enough because her tongue height position of vowel sound [ɪ] is nearly same with the vowel sound [i] of English native speaker.

In addition, NFM produces 732 Hz and English native speaker produces 1926 Hz for the formant two of vowel sound [ɪ]. From this fact, it is known that the formant two of vowel sound [ɪ] between these two speakers has large difference. NFM's formant two of vowel sound [ɪ] is very much lower than English native speaker. Therefore, it could be

concluded that NFM's tongue advancement in pronouncing vowel sound [ɪ] is not good enough because her tongue position is more backward than English native speaker.

For the formant one of vowel sound [ɛ], NFM produces it in 681 Hz and English native speaker produces it in 636 Hz. It is known that NFM's formant one of vowel sound [ɛ] is higher than English native speaker. However, the formant one of vowel sound [ɛ] produced by NFM is still in the range of vowel sound [ɛ]. It could be concluded that her tongue height position of vowel sound [ɛ] is good enough even though her tongue height is a bit lower than English native speaker.

Besides, NFM produces the formant two of vowel sound [ɛ] in 2488 Hz while English native speaker produces it in 1855 Hz. It is known that the formant two of vowel sound [ɛ] produced by NFM is higher than English native speaker. Therefore, it could be concluded that NFM's tongue advancement in pronouncing vowel sound [ɛ] is not good enough because her tongue position is more forward than English native speaker.

In the other side, NFM produces 832 Hz and English native speaker produces 820 Hz for the formant one of vowel sound [æ]. It is known that the formant one of vowel sound [æ] between these two speakers is not large and nearly same. The difference is only 12 Hz. It could be concluded that NFM's tongue height position in pronouncing vowel sound [æ] is good enough.

NFM produces 1682 Hz and English native speaker produces 1670 Hz for the formant two of vowel sound [æ]. It is known that the difference formant two of vowel sound [æ] between NFM and English native speaker is not large or nearly same. The difference is only 12 Hz. Based on Ogden's theory which the formant two relates to the frontness and the backness of the tongue, so it could be concluded NFM's the tongue position in pronouncing vowel sound [æ] is good enough.

d. The Vowel Quality of Speaker ML

Table 4.5 The comparison of formant value between speaker ML and English native speaker.

Vowel Sound	Speaker 4 (ML)		English Native Speaker	
	F1	F2	F1	F2
[i]	380	3115	395	2024
[ɪ]	431	2939	543	1926
[ɛ]	631	2563	636	1855
[æ]	631	2337	820	1670

Based on the table above, ML produces 380 Hz and English native speaker produces 395 Hz for the formant one of vowel sound [i]. It is known that the formant one of vowel sound [i] between these two speakers is nearly same. The difference is only 15 Hz. Therefore, it could be conclude that ML's position of tongue height of the vowel sound [i] is good enough.

ML produces 3115 Hz and English native speaker produces 2024 Hz for the formant two of vowel sound [i]. It is known that ML's formant two of vowel sound [i] is much higher than English native speaker. Based

on Ogden's theory where the higher formant two means the more forward the position of tongue, so it could be concluded that ML's tongue advancement in pronouncing vowel sound [i] is not good enough because her tongue position is more forward than English native speaker.

In the other side, for the formant one of vowel sound [ɪ] ML produces 431 Hz and English native speaker produces 543 Hz. It is known that the difference formant one of vowel sound [ɪ] between these two speakers is large. ML's formant one of vowel sound [ɪ] is lower than English native speaker. The formant one of vowel sound [ɪ] produced by ML is closer to the formant one of vowel sound [i] produced by English native speaker, that is 395 Hz. Formant one relates to vowel height and the higher formant one means the lower tongue position. Based on this fact, ML's tongue height position in pronouncing vowel sound [ɪ] is higher than English native speaker and causes her tongue position to be closer to vowel sound [i] produced by English native speaker. In summary, it could be concluded that ML's tongue height position in pronouncing vowel sound [ɪ] is not good enough because her tongue height position of vowel sound [ɪ] is nearly same with the vowel sound [i] of English native speaker.

Then, ML produces 2939 Hz and English native speaker produces 1926 Hz for the formant two of vowel sound [ɪ]. The difference of formant two of vowel sound [ɪ] between these two speakers is large. It is known that the formant two of vowel sound [ɪ] produced by ML is higher than English native speaker. Therefore, based on Ogden's theory, it could

be conclude that ML's tongue advancement in pronouncing vowel sound [ɪ] is not good enough because her tongue position is more forward than English native speaker.

After that, ML produces 631 Hz and English native speaker produces 636 Hz for the formant one of vowel sound [ɛ]. From this statement, it is known that the formant one of vowel sound [ɛ] between ML and English native speaker is very nearly same. The difference is only 5 Hz. From this condition, it could be concluded that ML's position of tongue height of vowel sound [ɛ] good enough.

For the formant two of vowel sound [ɛ], ML produces it in 2563 Hz while English native speaker produces it in 1855 Hz. It is known that the formant two of vowel sound [ɛ] produced by ML is higher than English native speaker. Therefore, it could be concluded that ML's tongue position in pronouncing vowel sound [ɛ] is not good enough because her tongue position is more forward than English native speaker.

Besides, ML produces 631 Hz and English native speaker produces 820 Hz for the formant one of vowel sound [æ]. It is known that the formant one of vowel sound [æ] produces by ML is lower than English native speaker. Furthermore, the formant one of vowel sound [æ] produced by ML is closer to the formant one of vowel sound [ɛ] produced by English native speaker, that is 636 Hz. The difference is only 5 Hz. Formant one relates to vowel height and the higher formant one means the lower tongue position. Based on this fact, ML's tongue height position in pronouncing vowel sound [æ] is higher than English

native speaker and causes her tongue position to be closer to vowel sound [ɛ] produced by English native speaker. In summary, it could be concluded that ML's tongue height position in pronouncing vowel sound [æ] is not good enough because her tongue height position of vowel sound [æ] is nearly same with the formant one of vowel sound [ɛ] of English native speaker.

While for the formant two of vowel sound [æ], ML produces it in 2337 Hz and English native speaker produces it in 1670 Hz. It is known that the formant two of vowel sound [æ] produces by ML is higher than English native speaker. Therefore, it could be concluded that ML's tongue advancement in pronouncing vowel sound [æ] is not good enough because her tongue position is more forward than English native speaker.

e. The Vowel Quality of Speaker NL

Table 4.6 The comparison of formant value between speaker NL and English native speaker.

Vowel Sound	Speaker 5 (NL)		English Native Speaker	
	F1	**F2**	**F1**	**F2**
[i]	380	2839	395	2024
[ɪ]	431	2739	543	1926
[ɛ]	606	2714	636	1855
[æ]	732	1460	820	1670

Based on the table above, it is known that NL produces 380 Hz while English native speaker produces 395 Hz for the formant one of vowel sound [i]. The difference F1 of these two speakers is not large and nearly same. The difference is just only 15 Hz. Based on Ogden's theory,

formant one related to tongue height, so it could be concluded that NL's tongue height position in pronouncing vowel sound [i] is good enough.

NL produces 2839 Hz and English native speaker produces 2021 Hz for the formant two of vowel sound [i]. It is known that the formant two of vowel sound [i] produced by NL is higher than English native speaker. Based on Ogden's theory, formant two relates to the frontness and the backness of tongue. Then the more forward the position of tongue means the higher formant two. Therefore, it could be concluded that NL's tongue advancement in pronouncing vowel sound [i] is not good enough because her tongue position is more forward than English native speaker.

Next, for the formant one of vowel sound [ɪ] NL produces 431 Hz and English native speaker produces 543 Hz. It is known that the difference formant one of vowel sound [ɪ] between these two speakers is large. NL's formant one of vowel sound [ɪ] is lower than English native speaker. The formant one of vowel sound [ɪ] produced by NL is closer to the formant one of vowel sound [i] produced by English native speaker, that is 395 Hz. Formant one relates to vowel height and the higher formant one means the lower tongue position. Based on this fact, NL's tongue height position in pronouncing vowel sound [ɪ] is higher than English native speaker and causes her tongue position to be closer to vowel sound [i] produced by English native speaker. In summary, it could be concluded that NL's tongue height position in pronouncing vowel sound [ɪ] is not good enough because her tongue height position of

vowel sound [ɪ] is nearly same with the vowel sound [i] of English native speaker.

For the formant two of vowel sound [ɪ], NL produces it in 2739 Hz while English native speaker produces it in 1926 Hz. It is known that the difference formant two of vowel sound [ɪ] between these two speakers is large. NL's formant two of vowel sound [ɪ] is much higher than English native speaker. From this condition, it could be concluded that NL's tongue advancement in pronouncing vowel sound [ɪ] is not good enough because her tongue position is more forward than English native speaker.

After that, NL produces 606 Hz and English native speaker produces 636 Hz for the formant one of vowel sound [ɛ]. It is known that the formant one of vowel sound [ɛ] produced by NL is lower than English native speaker. The difference is 30 Hz. Based on Ogden's theory, NL's tongue height in pronouncing vowel sound [ɛ] is higher than English native speaker. Therefore, it could be concluded that NL's tongue height position in pronouncing vowel sound [ɛ] is not good enough.

In addition, NL produces 2714 Hz while English native speaker produces 1855 Hz for the formant two of vowel sound [ɛ]. It is known that the formant two of vowel sound [ɛ] that is produced by NL is much higher than English native speaker. Therefore, it could be concluded that NL's tongue advancement in pronouncing vowel sound [ɛ] is not good

enough because her tongue position is more forward than English native speaker.

In the other side, NL produces 732 Hz while English native speaker produces 820 Hz for the formant one vowel sound [æ]. It is known that the formant one of vowel sound [æ] produced by NL is lower than English native speaker. However, this frequency is still in the range of formant one of vowel sound [æ]. Based on this condition, it could be concluded that NL's tongue height position in pronouncing vowel sound [æ] in good enough even though her tongue is a bit higher than English native speaker.

NL produces 1460 Hz while English native speaker produces 1670 Hz for the formant two of vowel sound [æ]. It is known that the formant two of vowel sound [æ] that is produced by NL is lower than English native speaker. Therefore, it could be concluded that NL's tongue advancement in pronouncing vowel sound [æ] is not good enough because her tongue position is more backward than English native speaker.

f. The Vowel Quality of Speaker RH

Table 4.7 The comparison of formant value between speaker RH and English native speaker.

Vowel Sound	Speaker 6 (RH)		English Native Speaker	
	F1	**F2**	**F1**	**F2**
[i]	406	2011	395	2024
[ɪ]	531	3065	543	1926
[ɛ]	807	1710	636	1855

[æ]	907	1635	820	1670

Based on the table above, it is known that RH produces 406 Hz and English native speaker produces 395 Hz for the formant one of vowel sound [i]. The difference formant one of vowel sound [i] produced by these two speakers is not large and nearly same. The difference is only 11 Hz. Based on Ogden's theory, formant one related to tongue height, so it could be concluded that NL's tongue height position in pronouncing vowel sound [i] is good enough.

RH produces 2011 Hz for the formant two of vowel sound [i] while English native speaker produces it in 2024 Hz. The difference formant two of vowel sound [i] between RH and English native speaker is not large, it is only 13 Hz. Based on Ogden's theory where formant two relates to tongue advancement (frontness and backness of tongue), so it could be concluded that RH's tongue advancement in pronouncing vowel sound [i] is good enough.

For the formant one of vowel sound [ɪ], RH produces it in 531 Hz while English native speaker produces it in 543 Hz. The difference formant one of vowel sound [ɪ] between these two speakers is only 12 Hz. From this condition, it is known that the difference is not large or nearly same. Therefore, it could be concluded that RH's tongue height in pronouncing vowel sound [ɪ] is good enough.

RH produces it in 3065 Hz while English native speaker produces it in 1926 Hz. It is known that the formant two of vowel sound [ɪ] that is produced by RH is much higher than English native speaker. Since

formant two relates to tongue advancement and the higher formant two means the more forward tongue position, it could be concluded that RH's tongue position in pronouncing vowel sound [ɪ] is not good enough because her tongue position is more forward than English native speaker.

Then, RH produces 807 Hz and English native speaker produces 636 Hz for the formant one of vowel sound [ɛ]. It is known that the difference formant one of vowel sound [ɛ] between these two speakers is large. RH's formant one of vowel sound [ɛ] is higher than English native speaker. The formant one of vowel sound [ɛ] produced by RH is closer to the formant one of vowel sound [æ] produced by English native speaker. Based on this fact, RH's tongue height position in pronouncing vowel sound [ɛ] is lower than English native speaker and causes her tongue height position to be nearly same as vowel sound [æ]. In summary, it could be concluded that RH's tongue height position in pronouncing vowel sound [ɛ] is not good enough because her tongue height position of vowel sound [ɛ] is nearly same with the vowel sound [æ] of English native speaker.

RH produces 1710 Hz while English native speaker produces 1855 Hz for the formant two of vowel sound [ɛ]. It is known that the formant two of vowel sound [ɛ] that is produced by RH is higher than English native speaker**.** Since formant two relates to tongue advancement and the higher formant two means more forward tongue position, it could be concluded that RH's tongue advancement in pronouncing vowel

sound [ɛ] is not good enough because her tongue position is more forward than English native speaker.

For the formant one of vowel sound [æ], RH produces it in 907 Hz while English native speaker produces it in 820 Hz. It is known that the difference formant one of vowel sound [æ] produced by these two speakers is large, that is 73 Hz. Formant one of vowel sound [æ] produces by RH is higher than English native speaker. Based on this fact, it could be concluded that RH's tongue position in pronouncing vowel sound [æ] is not good enough because her tongue position is lower than English native speaker.

RH produces 1635 Hz for the formant two of vowel sound [æ] while English native speaker produces it in 1670 Hz. The difference of formant two of vowel sound [æ] between RH and English native speaker is not too large, it is 35 Hz. Based on Ogden's theory where formant two relates to tongue advancement (frontness and backness of tongue), so it could be concluded that RH's tongue advancement in pronouncing vowel sound [æ] is good enough even though RH's tongue advancement is slightly backward than English native speaker.

g. The Vowel Quality of Speaker AM

Table 4.8 The comparison of formant value between speaker AM and English native speaker.

Vowel Sound	Speaker 7 (AM)		English Native Speaker	
	F1	**F2**	**F1**	**F2**
[i]	431	2990	395	2024
[ɪ]	531	1309	543	1926

[ɛ]	431	2939	636	1855
[æ]	882	1836	820	1670

Based on the table above, AM produces 431 Hz and English native speaker produces 395 Hz for the formant one of vowel sound [i]. It is known that the difference formant one of vowel sound [i] produced by these two speakers is 36 Hz. The difference is quite large but it still in the range of formant one of vowel sound [i]. AM's formant one of vowel sound [i] is a bit higher than English native speaker. The higher formant one means the lower tongue position. Based on this fact, it could be concluded that AM's tongue height position in pronouncing vowel sound [i] is already good enough even though the tongue height position is a bit lower than English native speaker.

AM produces 2990 Hz while English native speaker produces it in 2024 Hz for the formant two of vowel sound [i]. The formant two of vowel sound [ɪ] that is produced by AM is much higher than English native speaker. Since formant two relates to tongue advancement and the higher formant two means the more forward tongue position, so it could be concluded that AM's tongue advancement in pronouncing vowel sound [i] is not good enough because her tongue position is more forward than English native speaker.

For the formant one of vowel sound [ɪ], AM produces it in 531 Hz while English native speaker produce it in 543 Hz. It is known that the difference formant one of vowel sound [ɪ] produced by these two speakers is only 12 Hz. The difference is not large and nearly same.

Therefore, it could be concluded that AM's tongue height position in pronouncing vowel sound [ɪ] is good enough.

In addition, AM produces 1309 Hz and English native speaker produces 1926 Hz for the formant two of vowel sound [ɪ]. From this fact, it is known that there is large difference in producing formant two of vowel sound [ɪ] between these two speakers. AM's formant two of vowel sound [ɪ] is lower than English native speaker. Therefore, it could be concluded that AM's tongue position in pronouncing vowel sound [ɪ] is not good enough because her tongue position is more backward than English native speaker.

Then, for the formant one of vowel sound [ɛ], AM produces it in 431 Hz while English native speaker produces it in 636 Hz. It is known that the formant one of vowel sound [ɛ] produced by AM is lower than English native speaker. In addition, the formant one of vowel sound [ɛ] produced by AM is closer to the formant one of vowel sound [i] produced by English native speaker. Formant one relates to vowel height and the higher formant one means the lower tongue position. Based on this fact, AM's tongue height position in pronouncing vowel sound [ɛ] is higher than English native speaker and causes her tongue position to be closer to vowel sound [i] produced by English native speaker. In summary, it could be concluded that AM's tongue height position in pronouncing vowel sound [ɛ] is not good enough because her tongue height position of vowel sound [ɛ] is closer with the vowel sound [i] of English native speaker.

Besides, AM produces 2939 Hz while English native speaker produces 1855 Hz for the formant two of vowel sound [ɛ]. The formant two of vowel sound [ɛ] that is produced by AM is much higher than English native speaker. Therefore, it could be concluded that AM's tongue advancement in pronouncing vowel sound [ɛ] is not good enough because her tongue position is more forward than English native speaker.

In the other side, AM produces 882 Hz and English native speaker produces 820 Hz for the formant one of vowel sound [æ]. It is known that the difference formant one of vowel sound [æ] produces by these two speakers is large. AM produces the formant one of vowel sound [æ] higher than English native speaker. It could be concluded that AM's tongue height position in pronouncing vowel sound [æ] is not good enough because her tongue position is lower than English native speaker.

AM produces 1836 Hz while English native speaker produces it in 1670 Hz for the formant two of vowel sound [æ]. The formant two of vowel sound [æ] that is produced by AM is higher than English native speaker. Therefore, it could be concluded that AM's tongue advancement in pronouncing vowel sound [æ] is not good enough because her tongue position is more forward than English native speaker.

h. The Vowel Quality of Speaker MSF

Table 4.9 The comparison of formant value between speaker MSF and English native speaker.

Vowel Sound	**Speaker 8 (MSF)**		**English Native Speaker**	
	F1	**F2**	**F1**	**F2**
[i]	406	2889	395	2024

[ɪ]	531	2287	543	1926
[ɛ]	631	2036	636	1855
[æ]	807	2011	820	1670

Based on the table above, MSF produces 406 Hz and English native speaker produces 395 Hz for the formant one of vowel sound [i]. It is known that the difference of formant one of vowel sound [i] produced by these two speakers is 11 Hz. The difference is not large and nearly same. Since formant one relates to vowel height, so it could be concluded that MSF's tongue height position in pronouncing vowel sound [i] is good enough.

MSF produces 2889 Hz while English native speaker produces 2024 Hz for the formant two of vowel sound [i]. The formant two of vowel sound [i] that is produced by MSF is much higher than English native speaker. Since formant two relates to tongue advancement and the higher formant two means the more forward tongue position, it could be concluded that MSF's tongue position in pronouncing vowel sound [i] is not good enough because her tongue position is more forward than English native speaker.

Then, MSF produces 531 Hz and English native speaker produces 543 Hz for the formant one of vowel sound [ɪ]. It is known that the difference formant one of vowel sound [ɪ] produces by these two speakers is only 12 Hz. The difference is not large and nearly same. Based on this fact, it could be concluded that MSF's tongue height position in pronouncing vowel sound [ɪ] is good enough.

MSF produces 2287 Hz while English native speaker produces 1926 Hz for the formant two of vowel sound [ɪ]. The formant two of vowel sound [ɪ] that is produced by MSF is much higher than English native speaker. Therefore, it could be concluded that MSF's tongue position in pronouncing vowel sound [ɪ] is not good enough because her tongue position is more forward than English native speaker.

For the formant one of vowel sound [ɛ], MSF produces it in 631 Hz while English native speaker produces it in 636 Hz. The difference formant one of vowel [ɛ] produced by these two speakers is only 5 Hz. The difference is not large and nearly same. Based on this fact, it could be concluded that MSF's tongue height position in pronouncing vowel sound [ɛ] is good enough.

For the formant two of vowel sound [ɛ], MSF produces it in 2036 Hz while English native speaker produces it in 1855 Hz. The formant two of vowel sound [ɛ] that is produced by MSF is higher than English native speaker. Therefore, it could be concluded that MSF's tongue position in pronouncing vowel sound [ɛ] is not good enough because her tongue position is more forward than English native speaker.

For the formant one of vowel sound [æ], MSF produces it in 807 Hz while English native speaker produces it in 820 Hz. The difference formant one of vowel [æ] produced by these two speakers is only 13 Hz. The difference is not large and nearly same. Based on this fact, it could be concluded that MSF's tongue height position in pronouncing vowel sound [æ] is good enough.

Then for the formant two of vowel sound [æ], MSF produces it in 2011 Hz while English native speaker produces it in 1670 Hz. The formant two of vowel sound [æ] that is produced by MSF is higher than English native speaker. Therefore, it could be concluded that MSF's tongue position in pronouncing vowel sound [æ] is not good enough because her tongue position is more forward than English native speaker.

i. The Vowel Quality of Speaker KAY

Table 4.10 The comparison of formant value between speaker KAY and English native speaker.

Vowel Sound	Speaker 9 (KAY)		English Native Speaker	
	F1	**F2**	**F1**	**F2**
[i]	380	2613	395	2024
[ɪ]	406	2764	543	1926
[ɛ]	531	2789	636	1855
[æ]	757	2162	820	1670

Based on the table above, KAY produces 380 Hz and English native speaker produces 395 Hz for the formant one of vowel sound [i]. It is known that the difference of formant one of vowel sound [i] produced by these two speakers is only 15 Hz. The difference is not large and nearly same. Since formant one relates to vowel height, so it could be concluded that KAY's tongue height position in pronouncing vowel sound [i] is good enough.

KAY produces 2613 Hz while English native speaker produces 2024 Hz for the formant two of vowel sound [i]. The formant two of vowel sound [ɪ] that is produced by KAY is higher than English native

speaker. Since formant two relates to tongue advancement and the higher formant two means the more forward tongue position, it could be concluded that KAY's tongue advancement in pronouncing vowel sound [i] is not good enough because her tongue position is more forward than English native speaker.

After that, KAY produces 406 Hz and English native speaker produces 543 Hz for the formant one of vowel sound [ɪ]. It is known that the difference formant one of vowel sound [ɪ] between these two speakers is large. KAY's formant one of vowel sound [ɪ] is lower than English native speaker. The formant one of vowel sound [ɪ] produced by KAY is closer to the formant one of vowel sound [i] produced by English native speaker, that is 395 Hz. The difference is only 11 Hz. Formant one related to vowel height and the higher formant one means the lower tongue position. Based on this fact, KAY's tongue height position in pronouncing vowel sound [ɪ] is higher than English native speaker and causes her tongue position to be nearly same as vowel sound [i]. In summary, it could be concluded that KAY's tongue height position in pronouncing vowel sound [ɪ] is not good enough because her tongue height position of vowel sound [ɪ] is nearly same with the vowel sound [i] of English native speaker.

KAY produces 2764 Hz while English native speaker produces 1926 Hz for the formant two of vowel sound [ɪ]. The formant two of vowel sound [ɪ] that is produced by KAY is much higher than English native speaker. Therefore, it could be concluded that KAY's tongue

advancement in pronouncing vowel sound [ɪ] is not good enough because her tongue position is more forward than English native speaker.

After that, KAY produces 531 Hz and English native speaker produces 636 Hz for the formant one of vowel sound [ɛ]. It is known that the difference of formant one value of vowel sound [ɛ] produced by these two speakers is quite large. KAY's formant one of vowel sound [ɛ] is lower than English native speaker. Besides, the formant one of vowel sound [ɛ] produced by KAY is closer to the formant one of vowel sound [ɪ] produced by English native speaker, that is 543 Hz. The difference is only 12 Hz. Therefore, KAY's tongue height position in pronouncing vowel sound [ɛ] is higher than English native speaker and causes her tongue position to be nearly same as vowel sound [ɪ] produced by English native speaker. In summary, it could be concluded that KAY's tongue height position in pronouncing vowel sound [ɛ] is not good enough because her tongue height position of vowel sound [ɛ] is nearly same with the vowel sound [ɪ] of English native speaker.

For the formant two of vowel sound [ɛ], KAY produces it in 2789 Hz while English native speaker produces it in 1855 Hz. The formant two of vowel sound [ɛ] that is produced by KAY is higher than English native speaker. Therefore, it could be concluded that KAY's tongue position in pronouncing vowel sound [ɛ] is not good enough because her tongue position is more forward than English native speaker.

For the formant one of vowel sound [æ], KAY produces it in 757 Hz and English native speaker produces it in 820 Hz. It is known that

KAY's formant one of vowel sound [æ] is lower than English native speaker. However, the formant one of vowel sound [æ] produced by KAY is still in the range of the formant one of vowel sound [æ]. It could be concluded that KAY's tongue height of vowel sound [æ] is good enough even though her tongue height position is higher than English native speaker.

Then for the formant two of vowel sound [æ], KAY produces it in 2162 Hz while English native speaker produces it in 1670 Hz. The formant two of vowel sound [æ] that is produced by KAY is higher than English native speaker. Therefore, it could be concluded that KAY's tongue position in pronouncing vowel sound [æ] is not good enough because her tongue position is more forward than English native speaker.

j. The Vowel Quality of Speaker IN

Table 4.11 The comparison of formant value between speaker IN and English native speaker.

Vowel Sound	Speaker 10 (IN)		English Native Speaker	
	F1	**F2**	**F1**	**F2**
[i]	380	2689	395	2024
[ɪ]	406	2864	543	1926
[ɛ]	982	2287	636	1855
[æ]	1234	2162	820	1670

Based on the table above, IN produces 380 Hz and English native speaker produces 395 Hz for the formant one of vowel sound [i]. It is known that the difference formant one of vowel sound [i] produced by these two speakers is only 15 Hz. The difference is not large and nearly

same. Since formant one relates to vowel height, so it could be concluded that IN's tongue height position in pronouncing vowel sound [i] is good enough.

IN produces 2689 Hz while English native speaker produces 2024 Hz for the formant two of vowel sound [i]. The formant two of vowel sound [ɪ] that is produced by IN is higher than English native speaker. Since formant two relates to tongue advancement and the higher formant two means the more forward tongue position, it could be concluded that IN's tongue advancement position in pronouncing vowel sound [i] is not good enough because her tongue position is more forward than English native speaker.

In addition, IN produces 406 Hz and English native speaker produces 543 Hz for the formant one of vowel sound [ɪ]. It is known that the difference formant one of vowel sound [ɪ] between these two speakers is large. IN's formant one of vowel sound [ɪ] is lower than English native speaker. The formant one of vowel sound [ɪ] produced by IN is closer to the formant one of vowel sound [i] produced by English native speaker, that is 395 Hz. The difference is only 11 Hz. Formant one relates to vowel height and the higher formant one means the lower tongue position. Based on this fact, IN's tongue height position in pronouncing vowel sound [ɪ] is higher than English native speaker and causes her tongue position to be nearly same as vowel sound [i]. In summary, it could be concluded that IN's tongue height position in pronouncing vowel sound [ɪ] is not good enough because her tongue

height position of vowel sound [ɪ] is nearly same with the vowel sound [i] of English native speaker.

IN produces 2864 Hz while English native speaker produces 1926 Hz for the formant two of vowel sound [ɪ]. The formant two of vowel sound [ɪ] that is produced by IN is much higher than English native speaker. Therefore, it could be concluded that IN's tongue advancement position in pronouncing vowel sound [ɪ] is not good enough because her tongue position is more forward than English native speaker.

In the other side, IN produces 982 Hz and English native speaker produces 636 Hz for the formant one of vowel sound [ɛ]. It is known that the difference formant one of vowel sound [ɛ] produces by these two speakers is large. IN produces the formant one of vowel sound [ɛ] much higher than English native speaker. Based on this fact, it could be concluded that IN's tongue height position in pronouncing vowel sound [ɛ] is not good enough because her tongue position is lower than English native speaker.

For the formant two of vowel sound [ɛ], IN produces it in 2287 Hz while English native speaker produces it in 1855 Hz. The formant two of vowel sound [ɛ] that is produced by IN is higher than English native speaker. Therefore, it could be concluded that IN's tongue advancement position in pronouncing vowel sound [ɛ] is not good enough because her tongue position is more forward than English native speaker.

Then, IN produces 1234 Hz and English native speaker produces 820 Hz for the formant one of vowel sound [æ]. It is known that the

difference formant one of vowel sound [æ] produces by these two speakers is large. IN produces the formant one of vowel sound [æ] much higher than English native speaker. Based on this fact, it could be concluded that IN's tongue height position in pronouncing vowel sound [æ] is not good enough because her tongue position is lower than English native speaker.

Then, for the formant two of vowel sound [æ], IN produces it in 2162 Hz while English native speaker produces it in 1670 Hz. The formant two of vowel sound [æ] that is produced by IN is higher than English native speaker. Therefore, it could be concluded that IN's tongue advancement position in pronouncing vowel sound [æ] is not good enough because her tongue position is more forward than English native speaker.

k. Vowel Quality of Speaker AF

Table 4.12 The comparison of formant value between speaker AF and English native speaker.

Vowel Sound	**Speaker 11 (AF)**		**English Native Speaker**	
	F1	**F2**	**F1**	**F2**
[i]	406	2664	395	2024
[ɪ]	556	2287	543	1926
[ɛ]	636	1861	636	1855
[æ]	631	2538	820	1670

Based on the table above, AF produces 406 Hz and English native speaker produces 395 Hz for the formant one of vowel sound [i]. It is known that the difference of formant one of vowel sound [i] produced by

these two speakers is 11 Hz. The difference is not large and nearly same. Since formant one relates to vowel height, so it could be concluded that AF's tongue height position in pronouncing vowel sound [i] is good enough.

AF produces 2664 Hz while English native speaker produces 2024 Hz for the formant two of vowel sound [i]. The formant two of vowel sound [ɪ] that is produced by AF is higher than English native speaker. Since formant two relates to tongue advancement and the higher formant two means the more forward tongue position, it could be concluded that AF's tongue advancement position in pronouncing vowel sound [i] is not good enough because his tongue position is more forward than English native speaker.

AF produces 556 Hz and English native speaker produces 543 Hz for the formant one of vowel sound [ɪ]. It is known that the difference of formant one of vowel sound [ɪ] produced by these two speakers is 13 Hz. The difference is not large and nearly same. So, it could be concluded that AF's tongue height position in pronouncing vowel sound [ɪ] is good enough.

AF produces 2287 Hz while English native speaker produces 1926 Hz for the formant two of vowel sound [ɪ]. The formant two of vowel sound [ɪ] that is produced by AF is higher than English native speaker. Therefore, it could be concluded that AF's tongue advancement position in pronouncing vowel sound [ɪ] is not good enough because his tongue position is more forward than English native speaker.

Next, AF produces 636 Hz and English native speaker also produces 636 Hz for the formant one of vowel sound [ɛ]. It is known that formant one of vowel sound [ɛ] produced by these two speakers is same. Therefore, it could be concluded that AF's tongue height position in pronouncing vowel sound [ɛ] is good enough.

For the formant two of vowel sound [ɛ], AF produces it in 1861 Hz while English native speaker produces it in 1855 Hz. The difference formant two of vowel sound [ɛ] produced by these two speakers is not large and nearly same. Therefore, it could be concluded that AF's tongue advancement position in pronouncing vowel sound [ɛ] is good enough.

Then, AF produces 631 Hz and English native speaker produces 820 Hz for the formant one of vowel sound [æ]. It is known that the difference formant one of vowel sound [æ] produces by these two speakers is large. AF produces the formant one of vowel sound [æ] lower than English native speaker. The formant one of vowel sound [æ] produced by AF is closer to the formant one of vowel sound [æ] produced by English native speaker, that is 636 Hz. The difference is only 5 Hz. AF's tongue position in pronouncing vowel sound [æ] is higher than English native speaker and causes her tongue position to be nearly same as vowel sound [ɛ]. In summary, it could be concluded that AF's tongue height position in pronouncing vowel sound [æ] is not good enough because his tongue height position of vowel sound [æ] is nearly same with the vowel sound [ɛ] of English native speaker.

Then, for the formant two of vowel sound [æ], AF produces it in 2538 Hz while English native speaker produces it in 1670 Hz. The formant two of vowel sound [æ] that is produced by AF is higher than English native speaker. Therefore, it could be concluded that AF's tongue advancement position in pronouncing vowel sound [æ] is not good enough because his tongue position is more forward than English native speaker.

l. Vowel Quality of Speaker ADM

Table 4.13 The comparison of formant value between speaker ADM and English native speaker.

Vowel Sound	Speaker 12 (ADM)		English Native Speaker	
	F1	**F2**	**F1**	**F2**
[i]	380	2237	395	2024
[ɪ]	406	1911	543	1926
[ɛ]	631	1836	636	1855
[æ]	782	1811	820	1670

Based on the table above, ADM produces 380 Hz and English native speaker produces 395 Hz for the formant one of vowel sound [i]. It is known that the difference formant one of vowel sound [i] produced by these two speakers is only 15 Hz. The difference is not large and nearly same. Since formant one relates to vowel height, so it could be concluded that ADM's tongue height position in pronouncing vowel sound [i] is good enough.

ADM produces 2237 Hz while English native speaker produces 2024 Hz for the formant two of vowel sound [i]. The formant two of

vowel sound [ɪ] that is produced by ADM is higher than English native speaker. Since formant two relates to tongue advancement and the higher formant two means the more forward tongue position, it could be concluded that ADM's tongue advancement position in pronouncing vowel sound [i] is not good enough because his tongue position is more forward than English native speaker.

ADM produces 406 Hz and English native speaker produces 543 Hz for the formant one of vowel sound [ɪ]. It is known that the difference of formant one of vowel sound [ɪ] produced by these two speakers is large. ADM produces the formant one of vowel sound [æ] lower than English native speaker. The formant one of vowel sound [ɪ] produced by ADM is closer to the formant one of vowel sound [i] produced by English native speaker, that is 395 Hz. The difference is only 11 Hz. ADM's tongue position in pronouncing vowel sound [ɪ] is higher than English native speaker and causes his tongue position to be nearly same as vowel sound [i]. In summary, it could be concluded that ADM's tongue height position in pronouncing vowel sound [ɪ] is not good enough because his tongue height position of vowel sound [ɪ] is nearly same with the vowel sound [i] of English native speaker.

ADM produces 1911 Hz while English native speaker produces 1926 Hz for the formant two of vowel sound [ɪ]. The formant two of vowel sound [ɪ] that is produced by these two speakers is nearly same. The difference is only 15 Hz. Therefore, it could be concluded that AF's

tongue advancement position in pronouncing vowel sound [ɪ] is good enough.

Then, ADM produces 631 Hz and English native speaker produces 636 Hz for the formant one of vowel sound [ɛ]. It is known that the difference formant one of vowel sound [ɛ] produced by these two speakers is nor large and nearly same. The difference is only 5 Hz. Therefore, it could be concluded that ADM's tongue height position in pronouncing vowel sound [ɛ] is good enough.

For the formant two of vowel sound [ɛ], ADM produces it in 1836 Hz while English native speaker produces it in 1855 Hz. The difference formant two of vowel sound [ɛ] produced by these two speakers is not large and nearly same. The difference is 19 Hz. Therefore, it could be concluded that ADM's tongue advancement position in pronouncing vowel sound [ɛ] is good enough.

In the other side, ADM produces 782 Hz and English native speaker produces 820 Hz for the formant one of vowel sound [æ]. It is known that ADM's formant one of vowel sound [æ] is a bit lower than English native speaker but it is still in the range of formant one value of vowel sound [æ]. So, it could be concluded that ADM's tongue height position in pronouncing vowel sound [æ] is still good enough.

Then, for the formant two of vowel sound [æ], ADM produces it in 1811 Hz while English native speaker produces it in 1670 Hz. The formant two of vowel sound [æ] that is produced by ADM is higher than English native speaker. Therefore, it could be concluded that ADM's

tongue advancement position in pronouncing vowel sound [æ] is not good enough because his tongue position is more forward than English native speaker.

m. Vowel Quality of Speaker HM

Table 4.14 The comparison of formant value between speaker HM and English native speaker.

Vowel Sound	Speaker 13 (HM)		English Native Speaker	
	F1	F2	F1	F2
[i]	380	2337	395	2024
[ɪ]	406	2363	543	1926
[ɛ]	656	2137	636	1855
[æ]	832	1836	820	1670

Based on the table above, HM produces 380 Hz and English native speaker produces 395 Hz for the formant one of vowel sound [i]. It is known that the difference formant one of vowel sound [i] produced by these two speakers is only 15 Hz. The difference is not large and nearly same. Since formant one relates to vowel height, so it could be concluded that HM's tongue height position in pronouncing vowel sound [i] is good enough.

HM produces 2337 Hz while English native speaker produces 2024 Hz for the formant two of vowel sound [i]. The formant two of vowel sound [ɪ] that is produced by HM is higher than English native speaker. Since formant two relates to tongue advancement and the higher formant two means the more forward tongue position, it could be concluded that HM's tongue advancement position in pronouncing vowel

sound [i] is not good enough because his tongue position is more forward than English native speaker.

After that, HM produces 406 Hz and English native speaker produces 543 Hz for the formant one of vowel sound [ɪ]. It is known that the difference formant one of vowel sound [ɪ] between these two speakers is large. HM's formant one of vowel sound [ɪ] is lower than English native speaker. The formant one of vowel sound [ɪ] produced by HM is closer to the formant one of vowel sound [i] produced by English native speaker, that is 395 Hz. The difference is only 11 Hz. Based on this fact, HM's tongue height position in pronouncing vowel sound [ɪ] is higher than English native speaker and causes his tongue position to be nearly same as vowel sound [i]. In summary, it could be concluded that HM's tongue height position in pronouncing vowel sound [ɪ] is not good enough because her tongue height position of vowel sound [ɪ] is nearly same with the vowel sound [i] of English native speaker.

HM produces 2363 Hz while English native speaker produces 1926 Hz for the formant two of vowel sound [ɪ]. The formant two of vowel sound [ɪ] that is produced by HM is higher than English native speaker. Therefore, it could be concluded that HM's tongue advancement position in pronouncing vowel sound [ɪ] is not good enough because his tongue position is more forward than English native speaker.

Then, HM produces 656 Hz and English native speaker produces 636 Hz for the formant one of vowel sound [ɛ]. It is known that the difference formant one of vowel sound [ɛ] produced by these two

speakers is not large and nearly same. The difference is 20 Hz. Therefore, it could be concluded that HM's tongue height position in pronouncing vowel sound [ɛ] is good enough.

For the formant two of vowel sound [ɛ], HM produces it in 2137 Hz while English native speaker produces it in 1855 Hz. The difference formant two of vowel sound [ɛ] produced by these two speakers is large. HM's formant one of vowel sound [ɛ] is higher than English native speaker. Therefore, it could be concluded that HM's tongue advancement position in pronouncing vowel sound [ɛ] is not good enough because HM's tongue position in pronouncing vowel sound [ɛ] is more forward than English native speaker.

In the other side, HM produces 832 Hz and English native speaker produces 820 Hz for the formant one of vowel sound [æ]. It is known that the formant one of vowel sound [æ] between these two speakers is not large and nearly same. The difference is only 12 Hz. It could be concluded that HM's tongue height position in pronouncing vowel sound [æ] is good enough.

HM produces 1836 Hz and English native speaker produces 1670 Hz for the formant two of vowel sound [æ]. It is known that the difference formant two of vowel sound [æ] between HM and English native speaker is large. HM's formant one of vowel sound [æ] is higher than English native speaker. Therefore, it could be concluded that HM's tongue advancement position in pronouncing vowel sound [æ] is not

good enough because HM's tongue position in pronouncing vowel sound [æ] is more forward than English native speaker.

n. Vowel Quality of Speaker AR

Table 4.15 The comparison of formant value between speaker AR and English native speaker.

Vowel Sound	Speaker 14 (AR)		English Native Speaker	
	F1	F2	F1	F2
[i]	380	2513	395	2024
[ɪ]	531	2212	543	1926
[ɛ]	581	2337	636	1855
[æ]	807	1660	820	1670

Based on the table above, AR produces 380 Hz and English native speaker produces 395 Hz for the formant one of vowel sound [i]. It is known that the difference formant one of vowel sound [i] produced by these two speakers is only 15 Hz. The difference is not large and nearly same. Since formant one relates to vowel height, so it could be concluded that AR's tongue height position in pronouncing vowel sound [i] is good enough.

AR produces 2513 Hz while English native speaker produces 2024 Hz for the formant two of vowel sound [i]. The formant two of vowel sound [i] that is produced by AR is higher than English native speaker. Since formant two relates to tongue advancement and the higher formant two means the more forward tongue position, it could be concluded that AR's tongue advancement position in pronouncing vowel

sound [i] is not good enough because his tongue position is more forward than English native speaker.

AR produces 531 Hz while English native speaker produces 543 Hz for the formant one of vowel sound [ɪ]. It is known that the formant one of vowel sound [ɪ] produced by AR is nearly same with English native speaker where the difference is only 12 Hz. Since formant one relates to the tongue height, it could be concluded that AR's tongue height in pronouncing vowel sound [ɪ] is already good enough.

For the formant two of vowel sound [ɪ], AR produces it in 2212 Hz and English native speaker produces it in 1926 Hz. It is known that AR's formant two of vowel sound [ɪ] is higher than English native speaker. Based on this condition, AR's tongue position in pronouncing vowel sound [ɪ] is more forward than English native speaker. Therefore, it could be concluded that AR's tongue advancement in pronouncing vowel sound [i] is not good enough.

Then, AR produces 581 Hz while English native speaker produces 636 Hz for the formant one of vowel sound [ɛ]. It is known that the difference formant one of vowel sound [ɛ] produced by these two speakers is large. The formant one of vowel sound [ɛ] produced by AR is closer to the formant one of vowel sound [ɪ] produced by English native speaker, that is 543 Hz. Based on this fact, AR's tongue height position in pronouncing vowel sound [ɛ] is higher than English native speaker and causes her tongue position to be nearly same as vowel sound [ɪ]. In summary, it could be concluded that AR's tongue height position in

pronouncing vowel sound [ɛ] is not good enough because his tongue height position of vowel sound [ɛ] is nearly same with the vowel sound [ɪ] of English native speaker.

For the formant two of vowel sound [ɛ], AR produces it in 2337 Hz while English native speaker produces it in 1855 Hz. The difference formant two of vowel sound [ɛ] produced by these two speakers is large. AR's formant one of vowel sound [ɛ] is higher than English native speaker. Therefore, it could be concluded that AR's tongue advancement position in pronouncing vowel sound [ɛ] is not good enough because HM's tongue position in pronouncing vowel sound [ɛ] is more forward than English native speaker.

In the other side, AR produces 807 Hz and English native speaker produces 820 Hz for the formant one of vowel sound [æ]. It is known that the formant one of vowel sound [æ] between these two speakers is not large and nearly same. The difference is only 13 Hz. It could be concluded that AR's tongue height position in pronouncing vowel sound [æ] is good enough.

AR produces 1660 Hz and English native speaker produces 1670 Hz for the formant two of vowel sound [æ]. It is known that the difference formant two of vowel sound [æ] between AR and English native speaker is not large. The difference is only 10 Hz. Therefore, it could be concluded that AR's tongue advancement position in pronouncing vowel sound [æ] is already good enough.

o. Vowel Quality of Speaker ASR

Table 4.16 The comparison of formant value between speaker ASR and English native speaker.

Vowel Sound	Speaker 15 (ASR)		English Native Speaker	
	F1	**F2**	**F1**	**F2**
[i]	380	2438	395	2024
[ɪ]	380	2337	543	1926
[ɛ]	606	2237	636	1855
[æ]	807	1811	820	1670

Based on the table above, ASR produces 380 Hz and English native speaker produces 395 Hz for the formant one of vowel sound [i]. It is known that the difference formant one of vowel sound [i] produced by these two speakers is only 15 Hz. The difference is not large and nearly same. Since formant one relates to vowel height, so it could be concluded that ASR's tongue height position in pronouncing vowel sound [i] is good enough.

ASR produces 2438 Hz while English native speaker produces 2024 Hz for the formant two of vowel sound [i]. The formant two of vowel sound [i] that is produced by ASR is higher than English native speaker. Since formant two relates to tongue advancement and the higher formant two means the more forward tongue position, it could be concluded that ASR's tongue advancement position in pronouncing vowel sound [i] is not good enough because his tongue position is more forward than English native speaker.

Then, ASR produces 380 Hz while English native speaker produces 543 Hz for the formant one of vowel sound [ɪ]. It is known that the formant one of vowel [ɪ] produced by ASR is closer to the formant one of vowel sound [i] produced by English native speaker which has a frequency of 395 Hz. The difference is only 15 Hz. It is known that ASR's tongue height for the vowel sound [ɪ] is too high and causes her tongue height position to be nearly same as vowel sound [i] produced by English native speaker. So, it could be concluded that ASR's tongue height position in pronouncing vowel sound [ɪ] is not good enough because his tongue height position of vowel sound [ɪ] is nearly same with the vowel sound [i] of English native speaker.

For the formant two of vowel sound [ɪ], ASR produces it in 2337 Hz and English native speaker produces it in 1926 Hz. It is known that ASR's formant two of vowel sound [ɪ] is higher than English native speaker. Based on this condition, ASR's tongue position in pronouncing vowel sound [ɪ] is more forward than English native speaker. Therefore, it could be concluded that ASR's tongue advancement in pronouncing vowel sound [i] is not good enough.

Then, ASR produces 606 Hz and English native speaker produces 636 Hz for the formant one of vowel sound [ɛ]. It is known that the difference formant one of vowel sound [ɛ] produced by these two speakers is a bit large. The difference is 30 Hz but it still in the range of the formant one of vowel sound [ɛ]. Therefore, it could be concluded that

ASR's tongue height position in pronouncing vowel sound [ɛ] is good enough.

For the formant two of vowel sound [ɛ], ASR produces it in 2237 Hz while English native speaker produces it in 1855 Hz. The difference formant two of vowel sound [ɛ] produced by these two speakers is large. ASR's formant one of vowel sound [ɛ] is higher than English native speaker. Therefore, it could be concluded that ASR's tongue advancement position in pronouncing vowel sound [ɛ] is not good enough because his tongue position in pronouncing vowel sound [ɛ] is more forward than English native speaker.

For the formant one of vowel sound [æ], ASR produces it in 807 Hz while English native speaker produces it in 820 Hz. The difference formant one of vowel [æ] produced by these two speakers is only 13 Hz. The difference is not large and nearly same. Based on this fact, it could be concluded that ASR's tongue height position in pronouncing vowel sound [æ] is good enough.

Then for the formant two of vowel sound [æ], ASR produces it in 1811 Hz while English native speaker produces it in 1670 Hz. The formant two of vowel sound [æ] that is produced by ASR is higher than English native speaker. Therefore, it could be concluded that ASR's tongue position in pronouncing vowel sound [æ] is not good enough because his tongue position is more forward than English native speaker.

p. Vowel Quality of Speaker SA

Table 4.17 The comparison of formant value between speaker SA and English native speaker.

Vowel Sound	Speaker 16 (SA)		English Native Speaker	
	F1	**F2**	**F1**	**F2**
[i]	406	2287	395	2024
[ɪ]	531	2388	543	1926
[ɛ]	656	1836	636	1855
[æ]	807	1660	820	1670

Based on the table above, SA produces 406 Hz and English native speaker produces 395 Hz for the formant one of vowel sound [i]. It is known that the difference of formant one of vowel sound [i] produced by these two speakers is 11 Hz. The difference is not large and nearly same. Since formant one relates to vowel height, so it could be concluded that SA's tongue height position in pronouncing vowel sound [i] is good enough.

SA produces 2287 Hz while English native speaker produces 2024 Hz for the formant two of vowel sound [i]. The formant two of vowel sound [i] that is produced by SA is higher than English native speaker. Since formant two relates to tongue advancement and the higher formant two means the more forward tongue position, it could be concluded that SA's tongue advancement position in pronouncing vowel sound [i] is not good enough because his tongue position is more forward than English native speaker.

SA produces 531 Hz while English native speaker produces 543 Hz for the formant one of vowel sound [ɪ]. It is known that the formant one of vowel sound [ɪ] produced by SA is nearly same with English native speaker where the difference is only 12 Hz. Since formant one relates to the tongue height, it could be concluded that SA's tongue height in pronouncing vowel sound [ɪ] is already good enough.

For the formant two of vowel sound [ɪ], SA produces it in 2388 Hz and English native speaker produces it in 1926 Hz. It is known that SA's formant two of vowel sound [ɪ] is higher than English native speaker. Based on this condition, SA's tongue position in pronouncing vowel sound [ɪ] is more forward than English native speaker. Therefore, it could be concluded that SA's tongue advancement in pronouncing vowel sound [i] is not good enough.

Then, SA produces 656 Hz and English native speaker produces 636 Hz for the formant one of vowel sound [ɛ]. It is known that the difference formant one of vowel sound [ɛ] produced by these two speakers is not large and nearly same. The difference is 20 Hz. Therefore, it could be concluded that SA's tongue height position in pronouncing vowel sound [ɛ] is good enough.

For the formant two of vowel sound [ɛ], SA produces it in 1836 Hz while English native speaker produces it in 1855 Hz. The difference formant two of vowel sound [ɛ] produced by these two speakers is not large where the difference is only 21 Hz. Therefore, it could be

concluded that SA's tongue advancement position in pronouncing vowel sound [ɛ] is good enough.

For the formant one of vowel sound [æ], SA produces it in 807 Hz while English native speaker produces it in 820 Hz. The difference formant one of vowel [æ] produced by these two speakers is only 13 Hz. The difference is not large and nearly same. Based on this fact, it could be concluded that SA's tongue height position in pronouncing vowel sound [æ] is good enough.

Then for the formant two of vowel sound [æ], SA produces it in 1660 Hz while English native speaker produces it in 1670 Hz. The formant two of vowel sound [æ] that is produced by SA and English native speaker is not large where the difference is only 10 Hz. Therefore, it could be concluded that SA's tongue position in pronouncing vowel sound [æ] is already good enough.

q. Vowel Quality of Speaker UH

Table 4.18 The comparison of formant value between speaker UH and English native speaker.

Vowel Sound	**Speaker 17 (UH)**		**English Native Speaker**	
	F1	**F2**	**F1**	**F2**
[i]	506	3040	395	2024
[ɪ]	556	2262	543	1926
[ɛ]	681	2187	636	1855
[æ]	1083	1485	820	1670

Based on the table above, UH produces 506 Hz and English native speaker produces 395 Hz for the formant one of vowel sound [i]. It is

known that the difference formant one of vowel sound [i] produced by these two speakers is large. The formant one of vowel sound [i] produced by UH is closer to vowel sound [ɪ] produced by English native speaker. Since formant one relates to vowel height, so it could be concluded that UH's tongue height position in pronouncing vowel sound [i] is not good enough because her tongue position is lower than English native speaker.

UH produces 3040 Hz while English native speaker produces 2024 Hz for the formant two of vowel sound [i]. The formant two of vowel sound [i] that is produced by SA is higher than English native speaker. Since formant two relates to tongue advancement and the higher formant two means the more forward tongue position, it could be concluded that UH's tongue advancement position in pronouncing vowel sound [i] is not good enough because his tongue position is more forward than English native speaker.

UH produces 556 Hz and English native speaker produces 543 Hz for the formant one of vowel sound [ɪ]. It is known that the difference of formant one of vowel sound [ɪ] produced by these two speakers is 13 Hz. The difference is not large and nearly same. So, it could be concluded that UH's tongue height position in pronouncing vowel sound [ɪ] is good enough.

UH produces 2262 Hz while English native speaker produces 1926 Hz for the formant two of vowel sound [ɪ]. The formant two of vowel sound [ɪ] that is produced by UH is higher than English native speaker. Therefore, it could be concluded that UH's tongue advancement

position in pronouncing vowel sound [ɪ] is not good enough because her tongue position is more forward than English native speaker.

For the formant one of vowel sound [ɛ], UH produces it in 681 Hz and English native speaker produces it in 636 Hz. It is known that UH's formant one of vowel sound [ɛ] is higher than English native speaker. However, the formant one of vowel sound [ɛ] produced by UH is still in the range of vowel sound [ɛ]. It could be concluded that her tongue height position of vowel sound [ɛ] is good enough even though her tongue height is a bit lower than English native speaker.

Besides, UH produces the formant two of vowel sound [ɛ] in 2187 Hz while English native speaker produces it in 1855 Hz. It is known that the formant two of vowel sound [ɛ] produced by UH is higher than English native speaker. Therefore, it could be concluded that UH's tongue advancement in pronouncing vowel sound [ɛ] is not good enough because her tongue position is more forward than English native speaker.

Then, UH produces 1083 Hz and English native speaker produces 820 Hz for the formant one of vowel sound [æ]. It is known that the difference formant one of vowel sound [æ] produces by these two speakers is large. UH produces the formant one of vowel sound [æ] much higher than English native speaker. Based on this fact, it could be concluded that UH's tongue height position in pronouncing vowel sound [æ] is not good enough because her tongue position is lower than English native speaker.

Then, for the formant two of vowel sound [æ], UH produces it in 1485 Hz while English native speaker produces it in 1670 Hz. The formant two of vowel sound [æ] that is produced by UH is lower than English native speaker. Therefore, it could be concluded that UH's tongue advancement position in pronouncing vowel sound [æ] is not good enough because her tongue position is more backward than English native speaker.

r. Vowel Quality of Speaker AFD

Table 4.19 The comparison of formant value between speaker AFD and English native speaker.

Vowel Sound	Speaker 18 (AFD)		English Native Speaker	
	F1	**F2**	**F1**	**F2**
[i]	406	3040	395	2024
[ɪ]	431	3040	543	1926
[ɛ]	556	2538	636	1855
[æ]	656	1961	820	1670

Based on the table above, it is known that AFD produced 406 Hz and native speaker produced 395 Hz for the formant one of vowel sound [i]. The formant one of vowel sound [i] between these two speakers is nearly same with difference only 9 Hz. According to Ogden's theory that Formant one relates to tongue height, so it could be concluded that AFD's tongue height in pronouncing vowel sound [i] is good enough.

AFD produces 3040 Hz and English native speaker produces 2024 Hz for the formant two of vowel sound [i]. It is known that the difference between these two speakers is large. AFD produces the formant two of

vowel sound [i] higher than the English native speaker. Formant two is related to the frontness and the backness of tongue (advancement dimension of tongue). The more forward the position of tongue means the higher formant two. Because of that, it could be concluded that AFD's the tongue advancement in pronouncing vowel sound [i] is not good enough because her tongue position is much more forward than English native speaker.

In the other side, for the formant one of vowel sound [ɪ] AFD produces 431 Hz and English native speaker produces 543 Hz. It is known that the difference formant one of vowel sound [ɪ] between these two speakers is large. AFD's formant one of vowel sound [ɪ] is lower than English native speaker. The formant one of vowel sound [ɪ] produced by AFD is closer to the formant one of vowel sound [i] produced by English native speaker, that is 395 Hz. Formant one relates to vowel height and the higher formant one means the lower tongue position. Based on this fact, AFD's tongue height position in pronouncing vowel sound [ɪ] is higher than English native speaker and causes her tongue position to be closer to vowel sound [i] produced by English native speaker. In summary, it could be concluded that AFD's tongue height position in pronouncing vowel sound [ɪ] is not good enough because her tongue height position of vowel sound [ɪ] is nearly same with the vowel sound [i] of English native speaker.

Then, AFD produces 3040 Hz and English native speaker produces 1926 Hz for the formant two of vowel sound [ɪ]. The difference

of formant two of vowel sound [ɪ] between these two speakers is large. It is known that the formant two of vowel sound [ɪ] produced by AFD is higher than English native speaker. Therefore, based on Ogden's theory, it could be conclude that AFD's tongue advancement in pronouncing vowel sound [ɪ] is not good enough because her tongue position is more forward than English native speaker.

For the formant one of vowel sound [ɛ] AFD produces 556 Hz and English native speaker produces 636 Hz. It is known that the difference formant one of vowel sound [ɛ] between these two speakers is large. AFD's formant one of vowel sound [ɛ] is lower than English native speaker. The formant one of vowel sound [ɛ] produced by AFD is closer to the formant one of vowel sound [ɪ] produced by English native speaker, that is 543 Hz. Formant one relates to vowel height and the higher formant one means the lower tongue position. Based on this fact, AFD's tongue height position in pronouncing vowel sound [ɛ] is higher than English native speaker and causes her tongue position to be closer to vowel sound [ɪ] produced by English native speaker. In summary, it could be concluded that AFD's tongue height position in pronouncing vowel sound [ɛ] is not good enough because her tongue height position of vowel sound [ɛ] is nearly same with the vowel sound [ɪ] of English native speaker.

Besides, AFD produces the formant two of vowel sound [ɛ] in 2538 Hz while English native speaker produces it in 1855 Hz. It is known that the formant two of vowel sound [ɛ] produced by AFD is

higher than English native speaker. Therefore, it could be concluded that AFD's tongue advancement in pronouncing vowel sound [ɛ] is not good enough because her tongue position is more forward than English native speaker.

For the formant one of vowel sound [æ] AFD produces 656 Hz and English native speaker produces 820 Hz. It is known that the difference formant one of vowel sound [æ] between these two speakers is large. AFD's formant one of vowel sound [æ] is lower than English native speaker. The formant one of vowel sound [æ] produced by AFD is closer to the formant one of vowel sound [ɛ] produced by English native speaker, that is 636 Hz. Based on this fact, AFD's tongue height position in pronouncing vowel sound [æ] is higher than English native speaker and causes her tongue position to be closer to vowel sound [ɛ] produced by English native speaker. In summary, it could be concluded that AFD's tongue height position in pronouncing vowel sound [æ] is not good enough because her tongue height position of vowel sound [æ] is nearly same with the vowel sound [ɛ] of English native speaker.

Then, for the formant two of vowel sound [æ], AFD produces it in 1961 Hz while English native speaker produces it in 1670 Hz. The formant two of vowel sound [æ] that is produced by AFD is higher than English native speaker. Therefore, it could be concluded that AFD's tongue advancement position in pronouncing vowel sound [æ] is not good enough because her tongue position is more forward than English native speaker.

s. Vowel Quality of Speaker DAP

Table 4.20 The comparison of formant value between speaker DAP and English native speaker.

Vowel Sound	Speaker 19 (DAP)		English Native Speaker	
	F1	**F2**	**F1**	**F2**
[i]	506	2638	395	2024
[ɪ]	456	2939	543	1926
[ɛ]	531	2965	636	1855
[æ]	832	2463	820	1670

Based on the table above, for the formant one of vowel sound [i] DAP produces 506 Hz and English native speaker produces 395 Hz. It is known that the difference formant one of vowel sound [i] between these two speakers is large. DAP's formant one of vowel sound [i] is higher than English native speaker. The formant one of vowel sound [i] produced by DAP is closer to the formant one of vowel sound [ɪ] produced by English native speaker, that is 543 Hz. Formant one relates to vowel height and the higher formant one means the lower tongue position. Based on this fact, DAP's tongue height position in pronouncing vowel sound [i] is lower than English native speaker and causes her tongue position to be closer to vowel sound [ɪ] produced by English native speaker. In summary, it could be concluded that DAP's tongue height position in pronouncing vowel sound [i] is not good enough because her tongue height position of vowel sound [i] is nearly same with the vowel sound [ɪ] of English native speaker.

Besides, DAP produces the formant two of vowel sound [i] in 2638 Hz while English native speaker produces it in 2024 Hz. It is known that the formant two of vowel sound [i] produced by DAP is higher than English native speaker. Therefore, it could be concluded that DAP's tongue advancement in pronouncing vowel sound [i] is not good enough because her tongue position is more forward than English native speaker.

For the formant one of vowel sound [ɪ] DAP produces 456 Hz and English native speaker produces 543 Hz. It is known that the difference formant one of vowel sound [ɪ] between these two speakers is large. DAP's formant one of vowel sound [ɪ] is lower than English native speaker. The formant one of vowel sound [ɪ] produced by DAP is closer to the formant one of vowel sound [i] produced by English native speaker, that is 395 Hz. Based on this fact, DAP's tongue height position in pronouncing vowel sound [ɪ] is higher than English native speaker and causes her tongue position to be closer to vowel sound [i] produced by English native speaker. In summary, it could be concluded that DAP's tongue height position in pronouncing vowel sound [ɪ] is not good enough because her tongue height position of vowel sound [ɪ] is nearly same with the vowel sound [i] of English native speaker.

Besides, DAP produces the formant two of vowel sound [ɪ] in 2939 Hz while English native speaker produces it in 1926 Hz. It is known that the formant two of vowel sound [ɪ] produced by DAP is higher than English native speaker. Therefore, it could be concluded that

DAP's tongue advancement in pronouncing vowel sound [ɪ] is not good enough because her tongue position is more forward than English native speaker.

After that, DAP produces 531 Hz and English native speaker produces 636 Hz for the formant one of vowel sound [ɛ]. It is known that the difference of formant one value of vowel sound [ɛ] produced by these two speakers is quite large. DAP's formant one of vowel sound [ɛ] is lower than English native speaker. Besides, the formant one of vowel sound [ɛ] produced by DAP is closer to the formant one of vowel sound [ɪ] produced by English native speaker, that is 543 Hz. The difference is only 12 Hz. Therefore, DAP's tongue height position in pronouncing vowel sound [ɛ] is higher than English native speaker and causes her tongue position to be nearly same as vowel sound [ɪ] produced by English native speaker. In summary, it could be concluded that DAP's tongue height position in pronouncing vowel sound [ɛ] is not good enough because her tongue height position of vowel sound [ɛ] is nearly same with the vowel sound [ɪ] of English native speaker.

For the formant two of vowel sound [ɛ], DAP produces it in 2965 Hz while English native speaker produces it in 1855 Hz. The formant two of vowel sound [ɛ] that is produced by DAP is higher than English native speaker. Therefore, it could be concluded that DAP's tongue position in pronouncing vowel sound [ɛ] is not good enough because her tongue position is more forward than English native speaker.

In the other side, DAP produces 832 Hz and English native speaker produces 820 Hz for the formant one of vowel sound [æ]. It is known that the formant one of vowel sound [æ] between these two speakers is not large and nearly same. The difference is only 12 Hz. It could be concluded that DAP's tongue height position in pronouncing vowel sound [æ] is good enough.

DAP produces 2463 Hz and English native speaker produces 1670 Hz for the formant two of vowel sound [æ]. It is known that the difference formant two of vowel sound [æ] between DAP and English native speaker is large. DAP's formant one of vowel sound [æ] is higher than English native speaker. Therefore, it could be concluded that DAP's tongue advancement position in pronouncing vowel sound [æ] is not good enough because her tongue position in pronouncing vowel sound [æ] is more forward than English native speaker.

t. Vowel Quality of Speaker AS

Table 4.21 The comparison of formant value between speaker AS and English native speaker.

Vowel Sound	**Speaker 20 (AS)**		**English Native Speaker**	
	F1	**F2**	**F1**	**F2**
[i]	380	2488	395	2024
[ɪ]	406	2312	543	1926
[ɛ]	606	2187	636	1855
[æ]	681	1961	820	1670

Based on the table above, AS produces 380 Hz and English native speaker produces 395 Hz for the formant one of vowel sound [i]. It is

known that the difference formant one of vowel sound [i] produced by these two speakers is only 15 Hz. The difference is not large and nearly same. Since formant one relates to vowel height, so it could be concluded that AS's tongue height position in pronouncing vowel sound [i] is good enough.

AS produces 2488 Hz while English native speaker produces 2024 Hz for the formant two of vowel sound [i]. The formant two of vowel sound [i] that is produced by AS is higher than English native speaker. Since formant two relates to tongue advancement and the higher formant two means the more forward tongue position, it could be concluded that AS's tongue advancement position in pronouncing vowel sound [i] is not good enough because his tongue position is more forward than English native speaker.

AS produces 406 Hz and English native speaker produces 543 Hz for the formant one of vowel sound [ɪ]. It is known that the difference of formant one of vowel sound [ɪ] produced by these two speakers is large. AS produces the formant one of vowel sound [æ] lower than English native speaker. The formant one of vowel sound [ɪ] produced by AS is closer to the formant one of vowel sound [i] produced by English native speaker, that is 395 Hz. The difference is only 11 Hz. AS' tongue position in pronouncing vowel sound [ɪ] is higher than English native speaker and causes his tongue position to be nearly same as vowel sound [i]. In summary, it could be concluded that AS' tongue height position in pronouncing vowel sound [ɪ] is not good enough because his tongue

height position of vowel sound [ɪ] is nearly same with the vowel sound [i] of English native speaker.

AS produces 2312 Hz while English native speaker produces 1926 Hz for the formant two of vowel sound [ɪ]. The formant two of vowel sound [ɪ] that is produced by these two speakers has large difference. Therefore, it could be concluded that AS' tongue advancement position in pronouncing vowel sound [ɪ] is not good enough because his tongue advancement position in pronouncing vowel sound [ɪ] is more forward than English native speaker.

Then, AS produces 606 Hz and English native speaker produces 636 Hz for the formant one of vowel sound [ɛ]. It is known that the difference formant one of vowel sound [ɛ] produced by these two speakers is a bit large. The difference is 30 Hz but it still in the range of the formant one of vowel sound [ɛ]. Therefore, it could be concluded that AS' tongue height position in pronouncing vowel sound [ɛ] is good enough.

For the formant two of vowel sound [ɛ], AS produces it in 2187 Hz while English native speaker produces it in 1855 Hz. The difference formant two of vowel sound [ɛ] produced by these two speakers is large. AS' formant one of vowel sound [ɛ] is higher than English native speaker. Therefore, it could be concluded that AS' tongue advancement position in pronouncing vowel sound [ɛ] is not good enough because his tongue position in pronouncing vowel sound [ɛ] is more forward than English native speaker.

In the other side, for the formant one of vowel sound [æ], AS produces 681 Hz and English native speaker produces 820 Hz. It is known that the difference formant one of vowel sound [æ] between these two speakers is large. AS' formant one of vowel sound [æ] is lower than English native speaker. The formant one of vowel sound [æ] produced by AS is closer to the formant one of vowel sound [ɛ] produced by English native speaker, that is 636 Hz. Formant one relates to vowel height and the higher formant one means the lower tongue position. Based on this fact, AS' tongue height position in pronouncing vowel sound [æ] is higher than English native speaker and causes his tongue position to be closer to vowel sound [ɛ] produced by English native speaker. In summary, it could be concluded that AS' tongue height position in pronouncing vowel sound [æ] is not good enough because his tongue height position of vowel sound [æ] is nearly same with the vowel sound [ɛ] of English native speaker.

AS produces 1961 Hz and English native speaker produces 1670 Hz for the formant two of vowel sound [æ]. It is known that the difference formant two of vowel sound [æ] between AS and English native speaker is large. AS' formant one of vowel sound [æ] is higher than English native speaker. Therefore, it could be concluded that AS' tongue advancement position in pronouncing vowel sound [æ] is not good enough because his tongue position in pronouncing vowel sound [æ] is more forward than English native speaker.

B. Discussion of Research

1. The Vowel Formant Values Spoken by the 8th Semester of English Department of State Islamic Institute of Madura

This part discussed the formant values spoken by the 8th semester of English department of State Islamic Institute of Madura.

The first speaker is NF. For the vowel sound [i], she produces formant one in 380 Hz and formant two in 2789 Hz. For the vowel sound [ɪ], she produces formant one in 531 Hz and formant two in 2488 Hz. For the vowel sound [ɛ], she produces formant one in 807 Hz and formant two in 2212 Hz. Then, for the vowel sound [æ], she produces formant one in 907 Hz and formant two in 2087 Hz.

The second speaker is KA. For the vowel sound [i], she produces formant one in 406 Hz and formant two in 3015 Hz. For the vowel sound [ɪ], she produces formant one in 531 Hz and formant two in 2914 Hz. For the vowel sound [ɛ], she produces formant one in 807 Hz and formant two in 2162 Hz. Then, for the vowel sound [æ], she produces formant one in 782 Hz and formant two in 2287 Hz.

The third speaker is NFM. For the vowel sound [i], she produces formant one in 481 Hz and formant two in 2939 Hz. For the vowel sound [ɪ], she produces formant one in 380 Hz and formant two in 732 Hz. For the vowel sound [ɛ], she produces formant one in 681 Hz and formant two in 2488 Hz. Then, for the vowel sound [æ], she produces formant one in 832 Hz and formant two in 1682 Hz.

The forth speaker is ML. For the vowel sound [i], she produces formant one in 380 Hz and formant two in 3115 Hz. For the vowel sound [ɪ], she produces formant one in 431 Hz and formant two in 2939 Hz. For the vowel sound [ɛ], she produces formant one in 631 Hz and formant two in 2563 Hz. Then, for the vowel sound [æ], she produces formant one in 631 Hz and formant two in 2337 Hz.

The fifth speaker is NL. For the vowel sound [i], she produces formant one in 380 Hz and formant two in 2839 Hz. For the vowel sound [ɪ], she produces formant one in 431 Hz and formant two in 2739 Hz. For the vowel sound [ɛ], she produces formant one in 606 Hz and formant two in 2714 Hz. Then, for the vowel sound [æ], she produces formant one in 732 Hz and formant two in 1460 Hz.

The sixth speaker is RH. For the vowel sound [i], she produces formant one in 406 Hz and formant two in 2011 Hz. For the vowel sound [ɪ], she produces formant one in 531 Hz and formant two in 3065 Hz. For the vowel sound [ɛ], she produces formant one in 807 Hz and formant two in 1710 Hz. Then, for the vowel sound [æ], she produces formant one in 907 Hz and formant two in 1635 Hz.

The seventh speaker is AM. For the vowel sound [i], she produces formant one in 431 Hz and formant two in 2990 Hz. For the vowel sound [ɪ], she produces formant one in 531 Hz and formant two in 1309 Hz. For the vowel sound [ɛ], she produces formant one in 431 Hz and formant two in 2939 Hz. Then, for the vowel sound [æ], she produces formant one in 882 Hz and formant two in 1836 Hz.

The eighth speaker is MSF. For the vowel sound [i], she produces formant one in 406 Hz and formant two in 2889 Hz. For the vowel sound [ɪ], she produces formant one in 531 Hz and formant two in 2287 Hz. For the vowel sound [ɛ], she produces formant one in 631 Hz and formant two in 2036 Hz. Then, for the vowel sound [æ], she produces formant one in 807 Hz and formant two in 2011 Hz.

The ninth speaker is KAY. For the vowel sound [i], she produces formant one in 380 Hz and formant two in 2613 Hz. For the vowel sound [ɪ], she produces formant one in 406 Hz and formant two in 2764 Hz. For the vowel sound [ɛ], she produces formant one in 531 Hz and formant two in 2789 Hz. Then, for the vowel sound [æ], she produces formant one in 757 Hz and formant two in 2162 Hz.

The tenth speaker is IN. For the vowel sound [i], she produces formant one in 380 Hz and formant two in 2689 Hz. For the vowel sound [ɪ], she produces formant one in 406 Hz and formant two in 2864 Hz. For the vowel sound [ɛ], she produces formant one in 982 Hz and formant two in 2287 Hz. Then, for the vowel sound [æ], she produces formant one in 1234 Hz and formant two in 2162 Hz.

The eleventh speaker is AF. For the vowel sound [i], he produces formant one in 406 Hz and formant two in 2664 Hz. For the vowel sound [ɪ], he produces formant one in 556 Hz and formant two in 2287 Hz. For the vowel sound [ɛ], he produces formant one in 636 Hz and formant two in 1861 Hz. Then, for the vowel sound [æ], he produces formant one in 631 Hz and formant two in 2538 Hz.

The twelfth speaker is ADM. For the vowel sound [i], he produces formant one in 380 Hz and formant two in 2237 Hz. For the vowel sound [ɪ], he produces formant one in 406 Hz and formant two in 1911 Hz. For the vowel sound [ɛ], he produces formant one in 631 Hz and formant two in 1836 Hz. Then, for the vowel sound [æ], he produces formant one in 782 Hz and formant two in 1811 Hz.

The thirteenth speaker is HM. For the vowel sound [i], he produces formant one in 380 Hz and formant two in 2337 Hz. For the vowel sound [ɪ], he produces formant one in 406 Hz and formant two in 2363 Hz. For the vowel sound [ɛ], he produces formant one in 656 Hz and formant two in 2137 Hz. Then, for the vowel sound [æ], he produces formant one in 832 Hz and formant two in 1836 Hz.

The fourteenth speaker is AR. For the vowel sound [i], he produces formant one in 380 Hz and formant two in 2513 Hz. For the vowel sound [ɪ], he produces formant one in 531 Hz and formant two in 2212 Hz. For the vowel sound [ɛ], he produces formant one in 581 Hz and formant two in 2337 Hz. Then, for the vowel sound [æ], he produces formant one in 807 Hz and formant two in 1660 Hz.

The fifteenth speaker is ASR. For the vowel sound [i], he produces formant one in 380 Hz and formant two in 2438 Hz. For the vowel sound [ɪ], he produces formant one in 380 Hz and formant two in 2337 Hz. For the vowel sound [ɛ], he produces formant one in 606 Hz and formant two in 2237 Hz. Then, for the vowel sound [æ], he produces formant one in 807 Hz and formant two in 1811 Hz.

The sixteenth speaker is SA. For the vowel sound [i], he produces formant one in 406 Hz and formant two in 2287 Hz. For the vowel sound [ɪ], he produces formant one in 531 Hz and formant two in 2388 Hz. For the vowel sound [ɛ], he produces formant one in 656 Hz and formant two in 1836 Hz. Then, for the vowel sound [æ], he produces formant one in 807 Hz and formant two in 1660 Hz.

The seventeenth speaker is UH. For the vowel sound [i], she produces formant one in 506 Hz and formant two in 3040 Hz. For the vowel sound [ɪ], she produces formant one in 556 Hz and formant two in 2262 Hz. For the vowel sound [ɛ], she produces formant one in 681 Hz and formant two in 2187 Hz. Then, for the vowel sound [æ], she produces formant one in 1083 Hz and formant two in 1485 Hz.

The eighteenth speaker is AFD. For the vowel sound [i], she produces formant one in 406 Hz and formant two in 3040 Hz. For the vowel sound [ɪ], she produces formant one in 431 Hz and formant two in 3040 Hz. For the vowel sound [ɛ], she produces formant one in 556 Hz and formant two in 2538 Hz. Then, for the vowel sound [æ], she produces formant one in 656 Hz and formant two in 1921 Hz.

The nineteenth speaker is DAP. For the vowel sound [i], she produces formant one in 506 Hz and formant two in 3628 Hz. For the vowel sound [ɪ], she produces formant one in 456 Hz and formant two in 2939 Hz. For the vowel sound [ɛ], she produces formant one in 531 Hz and formant two in 2965 Hz. Then, for the vowel sound [æ], she produces formant one in 832 Hz and formant two in 2463 Hz.

The twentieth speaker is SA. For the vowel sound [i], he produces formant one in 380 Hz and formant two in 2488 Hz. For the vowel sound [ɪ], he produces formant one in 406 Hz and formant two in 2312 Hz. For the vowel sound [ɛ], he produces formant one in 606 Hz and formant two in 2187 Hz. Then, for the vowel sound [æ], he produces formant one in 681 Hz and formant two in 1961 Hz.

2. The Vowel Quality of the 8th Semester of English Department of State Islamic Institute of Madura Based on English Native Speaker Formant Value

In this part, researcher presents the result of vowel quality produced by the 8th semester of English department of State Islamic Institute of Madura. The vowel quality is the result of comparing the tongue height and tongue advancement (frontness and backness of tongue) between the 8th semester of English department of State Islamic Institute of Madura and English native speaker based on the formant value descriptively.

Tongue height is about how high and low the tongue position in pronouncing sound. Tongue height relates to formant one. Based on Ogden's theory, formant one relates to the vowel height. The higher formant one means the lower tongue position. In addition, tongue advancement is about how the tongue is pushed forward or backward within the oral cavity. This tongue advancement relates to formant two. Based on Ogden's theory, formant two relates to the frontness and the backness of tongue (advancement dimension of tongue), then the more forward the position of tongue means the higher formant two.

a. Tongue Height

There are several ways produced by the 8th semester of English department of State Islamic Institute of Madura in positioning the tongue height when pronouncing vowel sound [i], [ɪ], [ɛ], and [æ]. Among the kinds of those tongue heights are the tongue is in good position, higher tongue position, and lower tongue position than English native speaker.

1. Vowel Sound [i]

   Seventeen speakers have good tongue height in pronouncing vowel sound [i] while three speakers do not have good enough tongue height in pronouncing vowel sound [i]. Speakers who have good tongue height in pronouncing vowel sound [i] are NF, KA, ML, NL, RH, AM, MSF, KAY, IN, AF, ADM, HM, AR, ASR, SA, AFD, and AS while speaker who do not have good enough tongue height in pronouncing vowel sound [i] is NFM, UH, and DAP. The problem made by NFM UH, and DAP is that their tongue position in pronouncing vowel sound [i] is lower than English native speaker.

2. Vowel Sound [ɪ]

   Nine speakers have good tongue height in pronouncing vowel sound [ɪ] while the other eleven speakers do not. Five speakers who have good tongue height in pronouncing vowel sound [ɪ] are NF, KA, RH, AM, MSF, AF, AR, SA, and UH while the other five speakers who do not have good enough tongue height in pronouncing vowel sound [ɪ] are NFM, ML, NL, KAY, IN, ADM, HM, ASR, AFD, DAP,

and AS. The problem made by them is that their tongue position in pronouncing vowel sound [ɪ] is higher than English native speaker.

3. Vowel Sound [ɛ]

Ten speakers have good tongue height in pronouncing vowel sound [ɛ] while the other ten speakers do not. Ten speakers who have good tongue height in pronouncing vowel sound [ɛ] are NFM, ML, MSF, AF, ADM, HM, ASR, SA, UH, and AS while the other ten speakers who do not have good enough tongue height in pronouncing vowel sound [ɛ] are NF, KA, NL, RH, AM, KAY, IN. AR, AFD, and DAP. The problem made by NL, AM, KAY, AR, AFD, and DAP is that their tongue position in pronouncing vowel sound [ɛ] is higher than English native speaker while The problem made by NF, KA, RH, and IN is that their tongue position is lower than English native speaker.

4. Vowel Sound [æ]

Eleven speakers have good tongue height in pronouncing vowel sound [æ] while the other nine speakers do not. Eleven speakers who have good tongue height in pronouncing vowel sound [æ] are KA, NFM, NL, MSF, KAY, ADM, HM, AR, ASR, SA, and DAP while the other nine speakers who do not have good enough tongue height in pronouncing vowel sound [æ] are NF, ML, RH, AM, IN, AF, UH, AFD, and AS. The problem made by ML, AF, AFD, and AS is that their tongue position in pronouncing vowel sound [æ] is higher than English native speaker while the problem made by NF, RH, AM,

IN, and UH is that their tongue position in pronouncing vowel sound [æ] is lower than English native speaker.

a. Tongue Advancement

There are several ways in positioning the tongue advancements when pronouncing vowel sound [i], [ɪ], [ɛ], and [æ] by the 8th semester of English department of State Islamic Institute of Madura. Among the kinds of those tongue advancements are the tongue is in good position, more forward tongue position, and more backward tongue position than English native speaker.

1. Vowel Sound [i]

   One speaker has good tongue advancement in pronouncing vowel sound [i] while the other nineteen speakers do not have good enough tongue advancement. Speaker who has good tongue advancement in pronouncing vowel sound [i] is RH while speakers who do not have good enough tongue advancement in pronouncing vowel sound [i] are NF, KA, NFM, ML, NL, AM, MSF, KAY, IN, AF, ADM, HM, AR, ASR, SA, UH, AFD, DAP, AS. The problem made by them is that their tongue in pronouncing vowel sound [i] is more forward than English native speaker.

2. Vowel Sound [ɪ]

   One speaker has good enough tongue advancement in pronouncing vowel sound [ɪ] while the other nineteen speakers do not have good enough tongue advancement in pronouncing vowel sound [ɪ]. Speaker who has good enough tongue advancement in

pronouncing vowel sound [ɪ] is ADM. The other speakers who do not have good enough tongue advancement in pronouncing vowel sound [ɪ] are NF, KA, NFM, ML, NL, RH, AM, MSF, KAY, IN, AF, HM, AR, ASR, SA, UH, AFD, DAP, and AS. The problem made by NF, KA, ML, NL, RH, MSF, KAY, IN, AF, HM, AR, ASR, SA, UH, AFD, DAP, and AS is that their tongue in pronouncing vowel sound [ɪ] is more forward than English native speaker while NFM and AM's tongue in pronouncing vowel sound [ɪ] is more backward than English native speaker.

3. Vowel Sound [ɛ]

Three speakers have good enough tongue advancement in pronouncing vowel sound [ɛ] while the other seventeen speakers do not have good enough tongue advancement in pronouncing vowel sound [ɛ]. Speakers who have good enough tongue advancement in pronouncing vowel sound [ɛ] is AF, ADM, and SA while speakers who do not have good enough tongue advancement of vowel sound [ɛ] are NF, KA, NFM, ML, NL, RH, AM, MSF, KAY, IN, HM, AR, ASR, UH, AFD, DAP, and AS. The problem made by them is more forward than English native speaker.

4. Vowel Sound [æ]

Four speakers have good tongue advancement in pronouncing vowel sound [æ] while the other sixteen speakers do not have good enough tongue advancement. Speakers who have good tongue advancement in pronouncing vowel sound [æ] are NFM, RH, AR, SA

while speakers who do not have good enough tongue advancement in pronouncing vowel sound [æ] are NF, KA, ML, NL, AM, MSF, KAY, IN, AF, ADM, HM, ASR, UH, AFD, DAP, and AS. The problem made by NF, KA, ML, AM, MSF, KAY, IN, AF, ADM, HM, ASR, AFD, DAP, and AS is that their tongue in pronouncing vowel sound [æ] is more forward than English native speaker while problem made by NL and UH is that their tongue position in pronouncing vowel sound [æ] is more backward than English native speaker.