CHAPTER IV

DISCUSSION

4. 1 Quantitative Analysis

The data which have been collected are extended in the form of formula in order to find the answer of the question arises from the study. In this study, the writer uses quantitative analysis method to analyze the data. The statistical test used in this analysis is *T-test* because the writer wants to see whether there is significant difference of the mean of intelligibility between native speaker and that of non-native speaker.

The first step taken by the writer was calculating the average score (arithmetic mean) for each respondent. The formula and the calculation for respondent 1 (R1) for intelligibility towards English native speaker is as follows:

$$\bar{\times} = \frac{\text{correct answers x } 100}{\text{total questions}}$$

$$R1 = \frac{9}{21} \times 100$$

$$R1 = 42.86$$

In the formula above, Respondent 1 can understand 9 words out of 21 words pronounced by the English native speaker the averages for all respondents are presented in Table 4.1. To count the *t-value*, first, the writer has to count the difference between the score of English and Indonesian. Difference here is symbolized with '*d*'. This is also presented in Table 4.1.

Table 4.1 Difference (d) of English Speaker and Indonesian Speaker

Respondents		Speakers		d
		English	Indonesian	
1	R 1	42.86	57.14	-14.29
2	R 2	66.67	66.67	0.00
3	R 3	38.10	66.67	-28.57
4	R 4	57.14	66.67	-9.52
5	R 5	61.90	76.19	-14.29
6	R 6	80.95	71.43	9.52
7	R 7	80.95	66.67	14.29
8	R 8	38.10	52.38	-14.29
9	R 9	38.10	71.43	-33.33
10	R 10	33.33	66.67	-33.33
11	R 11	47.62	57.14	-9.52
12	R 12	47.62	61.90	-14.29
13	R 13	47.62	42.86	4.76
14	R 14	52.38	57.14	-4.76
15	R 15	47.62	57.14	-9.52
16	R 16	42.86	57.14	-14.29
17	R 17	28.57	42.86	-14.29
18	R 18	33.33	47.62	-14.29
19	R 19	52.38	66.67	-14.29
20	R 20	38.10	57.14	-19.05
21	R 21	38.10	47.62	-9.52
22	R 22	28.57	42.86	-14.29
23	R 23	23.81	42.86	-19.05
24	R 24	47.62	76.19	-28.57
25	R 25	19.05	28.57	-9.52
26	R 26	52.38	47.62	4.76
27	R 27	38.10	42.86	-4.76
28	R 28	28.57	52.38	-23.81
29	R 29	42.86	52.38	-9.52
30	R 30	23.81	42.86	-19.05
31	R 31	33.33	61.90	-28.57
Total (Σ)		1352.38	1747.62	-395.24

From the d scores in Table 4.1, the mean of difference ($\bar{d}$) could be drawn as follows:

$$\overline{d} = \frac{\Sigma d}{n}$$

where

$\overline{d}$: the mean of the difference (of the English and Indonesian scores)

Σd : total of the difference

n : number of participants

The result is:

$$\overline{d} = \frac{\Sigma d}{n}$$

$$= \frac{-395.24}{31}$$

$$\overline{d} = -12.75$$

After that, the writer also needs to count the standard deviation of the difference (S_d). The calculation could be drawn with the formula:

$$S_d = \sqrt{\frac{\Sigma\left(x_i^2 - \overline{d}^2\right)}{n-1}}$$

where

S_d : standard deviation of the difference

x_i : difference of English and Indonesian score

d : the mean of the difference (of the English and Indonesian score)

The result is:

$$S_d = \sqrt{\frac{\Sigma\left(x_i^2 - \overline{d}^2\right)}{n-1}}$$

$$= \sqrt{\frac{4053.92}{30}}$$

$$= \sqrt{135.13}$$

$$\boxed{S_d = 11.62}$$

The next step, the writer uses the formula by which the writer can find the

t value, that is:

$$\boxed{t = \frac{\overline{d}}{S_d / \sqrt{n}}}$$

where

t : correlation value

$\overline{d}$: the mean of the difference (of the English and Indonesian score)

S_d : standard deviation of the difference

n : number of students

Each value of $\overline{d}$ and S_d are inserted into the formula, and the result is:

$$t = \frac{\overline{d}}{S_d / \sqrt{n}}$$

$$= \frac{\overline{d}.\sqrt{n}}{S_d}$$

$$= \frac{-12.75 \times \sqrt{31}}{11.62}$$

$$= \frac{-70.89}{11.62}$$

$$\boxed{t = -6.1}$$

To find whether there is a significant difference of intelligibility between native English speaker and Indonesian speaker, the writer needs to use the t-test diagram. In this case, the writer has to find the $|t|$ value of the table. The writer decides the degree of confidence 95% ($\alpha = 0.05$). The $|t|_{n-1:\frac{\alpha}{2}}$ will be found in the t distribution table.

$$\boxed{|t|_{30:0.025} = 2.042}$$

The diagram is as follows:

-6.1   -2.042   2.042
(t)
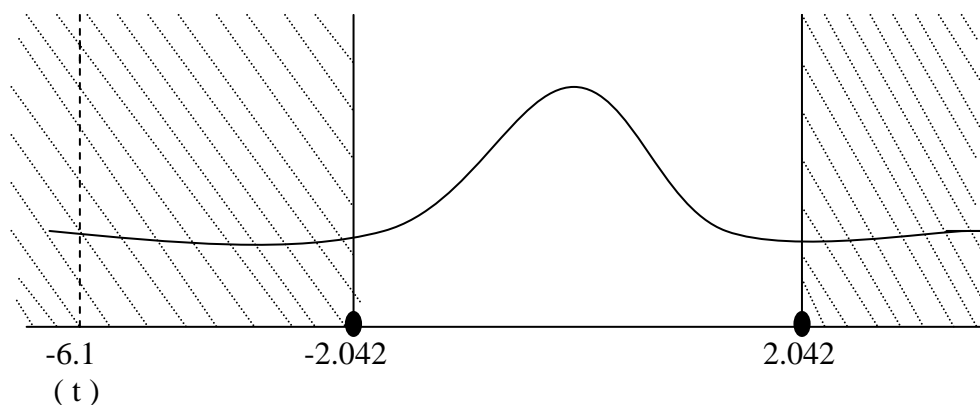
where

H_0: There is no significant difference of intelligibility of D3 students in English language of Airlangga University toward native speaker and non-native speaker of English.

H_1: There is a significant difference of intelligibility of D3 students in English language of Airlangga University toward native speaker and non-native speaker of English.

From the diagram above, it can be seen that the t value is outside the $|t|$ range. This means that the null hypothesis (H_o) is rejected. The resume of the analysis is that H_1 is accepted, which means that there is a significance difference of English vowel sound intelligibility of D3 students in English language of Airlangga University toward native speaker and non-native speaker of English.

4. 2 Intelligibility of Vowel Sounds Produced by Native English Speaker

The writer classifies the data into three parts in order to make it easier to be analyzed. The first part is the most difficult or the least intelligible English vowel sounds. The sounds that fall into this group are those identified incorrectly by 21 until 31 respondents. The second part is the difficult or less intelligible vowel sounds and the sounds that classified into this group are those found incorrectly by 11 until 20 respondents. Finally, the sounds which are recognized incorrectly by 1 until 10 respondents will classify into quite intelligible vowel sounds. Table 4.2 shows the intelligibility of vowel sounds produced by native English speaker.

Table 4.2 Intelligibility of Vowel Sounds produced by Native English Speaker

No	Words	English	
		TRUE	**FALSE**
1	Oar	0	31
2	Cheer	1	30
3	Cart	4	27
4	Fit	4	27
5	Bat	4	27
6	Cod	4	27
7	Boot	9	22
8	Poor	10	21
9	Shut	10	21
10	Fee	11	20
11	Firm	11	20
12	Saw	12	19
13	Chair	14	17
14	Fate	16	15
15	Note	17	14
16	Put	21	10
17	Crowd	24	7
18	Boy	26	5
19	Let	27	4
20	Rice	28	3
21	Letter	30	1

From the presentation of the data above, we can classify the words *oar, cheer, cart, fit, bat, cod, boot, poor,* and *shut* as the most difficult or the least intelligible vowel sounds because they have the greatest amount of mistakes compared with the other words. The second classification is the less intelligible vowel sounds. These words have fewer mistakes which also mean that these words are more intelligible than the previous part and the words are represented as follows; *fee, firm, saw, chair, fate,* and *note*. The words *put, crowd, boy, let, rice,*

and *letter* are then classified into vowel sounds which are quite intelligible because they have the least mistakes than the whole words given to the students. In the following paragraphs the writer tries to analyze each part of the classification.

The first classification is the most difficult or the least intelligible vowel sounds. The vowel sounds are represented with the following words: *oar*[ɔə], *cheer*[tʃɪə], *cart*[kɑːt], *fit*[fɪt], *bat*[bæt], *cod*[kɒd], *boot*[buːt], *poor*[pʊə], and *shut*[ʃʌt]. These words are classified into the most difficult words because they have the greatest amount of mistakes among the other words.

There are 31 students who found the word *oar*[ɔə] incorrectly and this sound occupied the first rank of intelligibility table to be the least intelligible vowel sound. According to O'Grady and Dobrovolsky (1996, p. 36) this sound is called centring diphthong. Centring diphthong occurred when the highest point of the tongue moves quickly towards the centre of the mouth during the final phase of the vowel articulation as it assumes for the articulation of schwa ([ə]). There are four centring diphthongs, namely[ɪə],[eə],[ʊə], and [ɔə] and as we can see that there are three out of four centring diphthongs which are being included in the first classification to be the least intelligible words. Those words are *oar*[ɔə], *cheer*[tʃɪə], and *poor*[pʊə].

In the case that none of the students were able to comprehend the word *oar*[ɔə] and 21 out of 31 students gave the wrong answer to comprehend the

word *poor*[pʊə], O'Grady and Dobrovolsky explain that nowadays, [ɔə] and

[ʊə] are disappearing from RP and probably in the newest ESL material, these

sounds are not modeled anymore. They are being replaced by[ɔ:]; as a result,

words like *paw, pore*, and *poor* rhyme with each other and they all came out

as[pɔ:]. In relation to their statement, the writer also finds the fact in this study

that students' intelligibility toward the word *oar*[ɔə] are replaced with

or[ɔ:r], *pore*[pɔ:r], *pour*[pɔ:r], and *four*[fɔ:r]. Meanwhile, the

sound[ʊə] in the word *poor* is substituted with sound[ɔ:] as in the word *four*

and *pour*, and also substituted with the sound [u:] as in the word *pool*. There are

30 students or there is only one student who able to comprehend this sound. Most

of the students interpreted this sound as *tear*[tɪeə], and *tea*[ti:].

The words *cart, fit, bat,* and *cod* have the same number of fault that 27

students gave a wrong answer toward the sound. The word *cart*[kɑ:t] is

interpreted mostly as *cut*[kʌt] and *cough*[kɒf]. The writer believes that it

happens because the students can not recognize the difference between the

sounds[ɑ:], [ʌ] and[ɒ]. The places of those sounds in the English vowel

system are relatively close to each other. [ɑ:] and [ɒ] are low back vowels;

meanwhile, [ʌ] is low central vowel. The students also substituted the word

fit[fɪt] mostly as *feet*[fiːt] and the sound [æ] in the word *bat*[bæt] is also substituted with [ə] as in the word *but*. It occurs because vowel [ɪ] and[æ] are not exist in Indonesian vowel system. The sound [ɒ] in the word *cod* is comprehended with sounds such as [ɔː] as in the word *caught* and *called* and[əʊ] as in the word *code, coat* and *cold*. It happens because in the production of these sounds, they are placed in approximately close to each other in the tongue.

There are 22 students who found the word *boot*[buːt] incorrectly and the vowel sound[uː] is mostly substituted with [əʊ] as in the word *boat* and *both* and [ʊ] as in the word *put*. It is obviously because those sounds are similarly pronounced in the back of the tongue. The last word of the first classification is the word *shut*[ʃʌt]. There are 21 students who recognized this word incorrectly and the sound [ʌ] is mostly substitute with the word *shot*[ʃɒt]. The writer believes it happens because the sounds [ʌ] and [ɒ] are placed close each other in the position of the tongue when it is produced so that most of the students interpreted sound [ʌ] as[ɒ].

The second classification is the words which are included into the less intelligible because these words have fewer mistakes than the other words which also mean that these words are more intelligible than the previous part. The words

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represent the vowel sounds as follows; *fee*[fiː], *firm*[fɜːm], *saw*[sɔː], *chair*[tʃeə], *fate*[feɪt], and *note*[nɔʊt]. The words fee and firm have the same number of fault, there are 20 students gave the wrong answer to those sounds. Most of the students substituted the sound [iː] in the word *fee* as [ɪə] in the word *fear* and it occurs because [ɪə] is placed between [ɪ] and [ə] in the production of these sounds in the tongue. Meanwhile, the vowel sound in the word *firm*[fɜːm] is mostly substituted with the sound [ɔː] as in the word *form*. These sounds are included as central vowels and the difference is that [ɜː] is placed in the centre of the tongue, while [ɔː] is at the back of the tongue.

There are also substitution occur in the word *saw*[sɔː], *fate*[feɪt], and *note*[nɔʊt]. The sound[ɔː] in the word *saw* is substituted with the diphthong [əʊ] as in the word *soul, show* and *so*. The writer considers that it happens because [ɔː] does not exist in Indonesian vowel system and that is why the students tend to simplify the sound as [əʊ] because the production of this diphthong is in between the sound [ə] and [ʊ] which exist in Indonesian vowel system. The sound[eɪ] in the word *fate* is comprehended by the students with [ɪ]as in the word *fit*. We can also conclude that it happens because the diphthong [eɪ] is not exists in Indonesian vowel system and the students simplified it by

deleting the [e] sound. The sound [ɔʊ] in the word *note* is substituted with the sounds [ɒ] as in the word *knot* and *not.* The writer believes that it happens because the sound [ɒ] is placed in the back of the tongue when it is being produced, while the elements of [ɔʊ] are from the sound [ɔ] and [ʊ] which is also placed in the back of the tongue

The last classification for vowel sound intelligibility produced by native English speaker is quite intelligible vowel sounds which also mean that these sounds are the most intelligible for the students because they have the least mistakes than the other words. The words are *put*[pʊt], *crowd*[kraʊd], *boy*[bɔɪ], *let*[let], *rice*[raɪs], and *letter*[letə]. The writer finds that all of these vowel sounds are included to be quite intelligible vowel sounds because these sounds including the diphthongs are mostly exist in Indonesian vowel system so the students do not have much difficulties to comprehend those sounds. The diphthongs[ɔɪ], [aʊ], and [aɪ] are three out of four diphthongs available in Indonesian vowel system. The monophthongs [e] and [ə] can also be found in the vowel systems of Indonesian language. They are two out of six Indonesian vowel sounds which can occur in initial, medial, and final positions in Indonesian language.

4. 3 Intelligibility of Vowel Sounds Produced by Non-Native English Speaker

As vowel sounds intelligibility produced by native English speaker, the data of the result of intelligibility produced by non-native English speaker are also categorized into three parts and the classification is the same as classification that the writer uses in vowel intelligibility produced by native English speaker. The first part will be included to be the most difficult or the least intelligible vowel sounds. The second is the less intelligible vowel sounds and the last classification is comprised into quite intelligible vowel sounds. Table 4.3 shows the data of vowel sounds intelligibility produced by non native English speaker.

Table 4.3 Intelligibility of Vowel Sounds Produced by Non-Native English Speaker

No	Words	Indonesian	
		TRUE	FALSE
1	Oar	0	31
2	Cod	0	31
3	Bat	3	28
4	Boot	6	25
5	Cart	7	24
6	Poor	12	19
7	Shut	13	18
8	Fit	14	17
9	Firm	15	16
10	Fee	18	13
11	Chair	18	13
12	Note	21	10
13	Cheer	21	10
14	Fate	23	8
15	Crowd	24	7
16	Let	25	6
17	Saw	28	3

18	Boy	29	2
19	Put	29	2
20	Letter	30	1
21	Rice	31	0

From the data above, the writer then classify the words *oar, cod, bat, boot,* and *cart* to be included in the first classification. The second classification will consist of *poor, shut, fit, firm, fee,* and *chair* and the rest of the words will occupy the last classification and the words are as follows; *note, cheer, fate, crowd, let, saw, boy, put, letter,* and *rice.* The following sentences will explain about each classification of vowel intelligibility.

The first classification is called the least intelligible or the most difficult vowel sounds for the students to be comprehended. These words included to this classification because they have the greatest number of mistakes than all of the words. The words consist of *oar*[ɔə], *cod*[kɒd], *bat*[bæt], *boot*[buːt], and *cart*[kɑːt]. There are 31 students who recognize the word *oar* incorrectly. This sound mostly substituted with the words *or*[ɔːr] and *for*[fər]. It happens, as the writer has explained before, because[ɔə]is disappearing in RP. The sound [ɒ]in the word *cod* is substituted mostly with the sounds [ɔː] as in the word *caught* and *called* [əʊ] as in the word *code, coat* and *cold.* There are also 31 students who could not comprehend this word correctly and it happens because in

the production of these sounds, they are placed in approximately close to each other in the tongue.

In the word *bat*[bæt], there are 28 students who found it difficult to be comprehended. The students substituted the sound [æ] with [ɑ:] as in the word *bath*. Basically, these two sounds are called low vowel and the writer believes that the students can not recognized whether it is placed in the front of the tongue [æ] or in the back[ɑ:]. In the word *boot*[bu:t], 25 students could not give the right answer. The vowel sound[u:] is substituted with [eʊ] in the word *boat* and *both*, [ʊ] in the word *put and* it happens because these sounds are similarly pronounced in the back of the tongue and also because the position of the tongue when these sounds produced is high. There are 24 students found the word *cart*[kɑ:t] incorrectly and this sound is mostly interpreted as *cut*[kʌt], *cough*[kɒf]and *cod*[kɒd]. The writer thinks that it happens because the students can not recognize the difference between the sounds[ɑ:], [ʌ] and[ɒ]. The places of those sounds in the English vowel system are relatively close to each other. [ɑ:] and [ɒ] are low back vowels; meanwhile, [ʌ] is low central vowel.

The next classification is called less intelligible vowel sounds. These words have fewer mistakes means that these sounds are more intelligible than the

previous classification. The words which included into this classification are *poor*[pʊə], *shut*[ʃʌt], *fit*[fɪt], *firm*[fɜːm], *fee*[fɪː], and *chair*[tʃeə].

The sound[ʊə] in the word *poor* is substituted with sound[ɔː] as in the word *four, pore* and *pour*, and the sound [ə] as in the word *for*. The sound [ʊə] according to O'Grady and Dobrovolsky (1996, p. 36) is disappearing in the RP and in many other varieties of British English. In addition, these sounds are not given anymore in this department. Thus, it is reasonable why there are 19 students who recognized this sound incorrectly.

The word *shut*[ʃʌt] is mostly substituted with the word *shot*[ʃɒt] and 18 students found it difficult to comprehend this sound. The writer believes it happens because sounds [ʌ] and [ɒ] are placed close each other in the position of the tongue when it is produced so that most of the students interpreted sound [ʌ] as[ɒ]. In the word *fit*[fɪt], there are 17 students who could not give the right answer. They substituted the word *fit*[fɪt] mostly as *faith*[feɪθ]. The students were substituted the sound [ɪ] become the diphthong [eɪ] and it occurs because the elements of the diphthong are in between the sound [e] and[ɪ]. There are 16 students who substituted the word *firm*[fɜːm] with the sound [ɔː] as in the words *form*. The writer considers that these sounds are included as central vowels and the difference is that [ɜː] placed in the central of

the tongue, while [ɔ:] is at the back of the tongue. That is why the students tend

to substitute the sound [ɜ:] with[ɔ:]. The sound [i:] in the word *fee* is

mostly substituted as [ɪə] in the word *fear* and there are 13 students who found

it difficult to comprehend. The writer considers that it occurs because [ɪə] is

placed between [ɪ] and [ə] in the production of these sounds in the tongue.

The last classification of vowel sounds intelligibility produced by non-native English speaker is quite intelligible vowel sounds which also mean that these vowels sounds are the most intelligible vowel sounds than the other vowel sounds produced by non-native English speaker. These sounds include *note*[nɔʊt], *cheer*[tʃɪə], *fate*[feɪt], *crowd*[kraʊd], *let*[let], *saw*[sɔ:], *boy*[bɔɪ], *put*[pʊt], *letter*[letə], and *rice*[raɪs]. All of the

students give the right answer for the word *rice* and there are no substitution

happened in the words *let, crowd* and *letter.*

The word *note*[nɔʊt] and *cheer*[tʃɪə] have similar number of

students who recognized it incorrectly. There are 10 students who have difficulties

to comprehend these sounds. The word *fate*[feɪt] has 8 students who found it

incorrectly and only 3 students who found the word *saw*[sɔ:] difficult to

comprehend. Furthermore, there are only 2 students who found the word *boy*

[bɔɪ] and *put* [pʊt] difficult to be comprehended. The writer considers that

the sounds[eɪ], [ɔ:], [ɔɪ], and [ʊ] exist in Indonesian vowel system; therefore, the students tend to have no difficulties to comprehend these sounds.

4. 4 Interpretation of the Result

The result of the statistical test shows that there is a significant difference of the D3 students' intelligibility of vowel sounds produced by native and non-native speaker. In the following paragraphs the writer will discuss the differences that occurred and also the possibility that affecting why those differences happens.

As provided in Table 4.2 there are 9 words which are included into the least intelligible vowel sounds by the students toward the native speaker, which are; *oar*[ɔə], *cheer*[tʃɪə], *cart*[kɑ:t], *fit*[fɪt], *bat*[bæt], *cod*[kɒd], *boot*[bu:t], *poor*[pʊə], and *shut*[ʃʌt]; while there are only 5 words (Table 4.3) which are included to be the most difficult words produced by non-native speaker, the words are; *oar*[ɔə]*, cod*[kɒd]*, bat*[bæt]*, boot*[bu:t]*, and cart*[kɑ:t]. There are more sounds produced by the native speaker which fall into the most difficult sounds than the sounds produced by Indonesian speaker.

In the first classification of Intelligibility produced by native speaker, as we can see that there are three out of four centring diphthongs which classified into the most difficult sounds, they are [ɪə], [ʊə], and [ɔə]. According to O'Grady and Dobrovolsky (1996, p. 36), this happens because they are disappearing from RP and many other varieties of British English. They state that

these sounds are being replaced by[ɔː]; therefore, the writer finds that students comprehended the word *oar*[ɔə] and [ʊə] as *or*[ɔːr], *pore*[pɔːr], *pour*[pɔːr], and *four*[fɔːr].

There is similarity of the two tables related to the number of words which included into the second group that is the less intelligible vowel sounds. There are 6 words which are included to be the less intelligible produced by native speaker are; *fee*[fiː], *firm*[fɜːm], *saw*[sɔː], *chair*[tʃeə], *fate*[feɪt], and *note*[nɔʊt] and also 6 words which produced by non-native speaker; *poor*[pʊə], *shut*[ʃʌt], *fit*[fɪt], *firm*[fɜːm], *fee*[fɪː], and *chair*[tʃeə]. The explanation toward these two categories is that because some of the sounds are not exist in the Indonesian vowel sounds so that the students do not recognize the sounds and obviously difficult to comprehend the right answers.

There are more words in Table 4.3 which are classified as quite intelligible. 10 words are classified into quite intelligible vowel sounds; meanwhile, there are only 6 words which are found by the students more than the other words in Table 4.2 which shows the intelligibility produced by native speaker. In other words, the words produced by non-native speaker are more intelligible than the words produced by the native English speaker. In addition, the writer notices that the findings above is in collusion with Nelson's (1982, p. 59) claim that the extent to which they share characteristics of cultural background, as

well as the extent to which their languages share phonological and grammatical

features, will determine the degree to which they find one another "intelligible".