CHAPTER III
PRESENTATION AND ANALYSIS OF THE DATA

III. 1 Presentation of the Data

In order to know the abilities of the students of product design engineering in comprehending picture story and written text, the data are presented by using three tables. Table one is the result of test I (picture story). Table two is the result of test II (written text) and the third one is the result of both of the tests.

Table III.1
The Result of Test I
(Picture Story)

No	Respondents	Score
1.	X 1	73.3
2.	X 2	66.7
3.	X 3	80
4.	X 4	73.3
5.	X 5	73.3
6.	X 6	86.7
7.	X 7	73.3
8.	X 8	80
9.	X 9	66.7
10.	X 10	73.3
11.	X 11	80
12.	X 12	60

29

13.	X 13	40
14.	X 14	66.7
15	X 15	80
16.	X 16	40
17.	X 17	73.3
18.	X 18	73.3
19.	X 19	80
20.	X 20	80
21.	X 21	66.7
22.	X 22	73.3
23.	X 23	73.3
24.	X 24	60
25.	X 25	60
26.	X 26	80
27.	X 27	46.7
28.	X 28	73.3
29.	X 29	66.7
30.	X 30	73.3
	TOTAL	2093.2

Table III.1 represents the respondents' performances in comprehending picture story. From the data, it can be seen that there are three respondents or 10% whose scores are under 60. Meanwhile, 90% or 27 of them have the scores above

60. The highest score in test I is 86.7 and the lowest is 40. From this table, it can be inferred that in average, most of the respondents get high scores (above 60). They generally have the same abilities in comprehending picture story, though in fact, there are two respondents who get the scores under 60. They are X13 (40), X16 (40) and X27 (46.7). Moreover, the mean value of this test is 69.8

Table III.2
The Result of Test II
(Written Text)

No	Respondents	Score
1.	X 1	66.7
2.	X 2	53.3
3.	X 3	46.7
4.	X 4	46.7
5.	X 5	53.3
6.	X 6	46.7
7.	X 7	46.7
8.	X 8	73.3
9.	X 9	53.3
10.	X 10	46.7
11.	X 11	66.7
12.	X 12	53.3
13.	X 13	33.3
14.	X 14	53.3
15	X 15	60

16.	X 16	33.3
17.	X 17	60
18.	X 18	40
19.	X 19	66.7
20.	X 20	73.3
21.	X 21	46.7
22.	X 22	46.7
23.	X 23	66.7
24.	X 24	46.7
25.	X 25	53.3
26.	X 26	53.3
27.	X 27	40
28.	X 28	60
29.	X 29	53.3
30.	X 30	53.3
	TOTAL	1593.3

Table III.2 represents the respondents' performances in comprehending written text. From the data, there are 8 or 26.7 % of the respondents who get the scores above 60. While, 22 or 73.3 % of the respondents get the scores under 60. The highest score in test II is 73.3 and the lowest score is 33.3. Moreover, there are two respondents who get this score. Whereas, the lowest score in test II is 33.3 and there are also two respondents who get the same score. From this data, it can

be seen that almost all of the respondents gain lower scores (under 60) than those

of the first test and the differences of the sores of the second test are not too great.

Moreover, the mean value from the second test is 53.11

Table III.3
The Result of the Tests
(Picture Story & Written Text)

No	Respondents	Test I	Test II	Total
1.	X 1	73.3	66.7	140
2.	X 2	66.7	53.3	120
3.	X 3	80	46.7	126.7
4.	X 4	73.3	46.7	120
5.	X 5	73.3	53.3	126.6
6.	X 6	86.7	46.7	133.4
7.	X 7	73.3	46.7	120
8.	X 8	80	73.3	153.3
9.	X 9	66.7	53.3	120
10.	X 10	73.3	46.7	120
11.	X 11	80	66.7	146.7
12.	X 12	60	53.3	113.3
13.	X 13	40	33.3	73.3
14.	X 14	66.7	53.3	120
15	X 15	80	60	140
16.	X 16	40	33.3	73.3

17.	X 17	73.3	60	133.3
18.	X 18	73.3	40	113.3
19.	X 19	80	66.7	146.7
20.	X 20	80	73.3	153.3
21.	X 21	66.7	46.7	113.4
22.	X 22	73.3	46.7	120
23.	X 23	73.3	66.7	140
24.	X 24	60	46.7	106.7
25.	X 25	60	53.3	113.3
26.	X 26	80	53.3	133.3
27.	X 27	46.7	40	86.7
28.	X 28	73.3	60	133.3
29.	X 29	66.7	53.3	120
30.	X 30	73.3	53.3	126.6
	TOTAL	2093.2	1593.3	3686.5

Table III.3 shows that most of the respondents have lower scores. Obviously, there are 27 or 90 % of the respondents who have lower scores. It means that their scores in their first test (picture story) are better than those in the second test (written text). Some of them reveal great differences in those two tests. For instances, the scores of X6 in which the highest score in picture story-86.7 extremely decline to 46.7 (the score in written text). However, most of the scores

of the respondents in test I (picture story) are always higher than those in test II (written text), though in fact, there are 3 or 10 % of the respondents who get low scores in both of these tests, namely X13 whose scores are 40 and 33.3, X16 40 and 33.3 and X27 46.7 and 40 from both of the tests. The mean value of test I (picture story) is 69.77, while the mean value of test II (written text) is 53.11. This also shows that the respondents' scores in the first test are better than those in the second test.

III.2   Quantitative Analysis

The quantitative analysis uses the chi square test in order to know the abilities of the students of product design engineering in comprehending picture story and written text. The chi square test is presented into tables. Moreover, the formula of the elements are :

$$\sum \chi^2 = \sum o \sum e \frac{(fo - fe)^2}{fe} \quad ; \quad fe = \frac{n_c \times n_r}{N}$$

χ^2 = the chi square value

fo   = the present value

fe   = the expectation value

c   = column

r   = row

n_c = total value for the column (see table III.3)

n_r = total value for the row (see table II.3)

N   = total value

Table III.4
Chi Square Test

Respondents	No	Fo	$Fe = \dfrac{n_c \times n_r}{N}$	fo-fe	$(fo\text{-}fe)^2$	$\dfrac{(fo - fe)^2}{fe}$
X1	1.	73.3	$\dfrac{2093.2 \times 140}{3686.5} = 79.5$	-6.2	38.44	0.48
	2.	66.7	$\dfrac{1593.3x140}{3686.5} = 60.5$	6.2	38.44	0.64
X2	3	66.7	$\dfrac{2093.2x120}{3686.5} = 68.1$	-1.4	1.96	0.03
	4	53.3	$\dfrac{1593.3x120}{3686.5} = 51.9$	1.4	1.96	0.04
X3	5	80	$\dfrac{2093.2x126.7}{3686.5} = 71.9$	8.1	65.61	0.91
	6	46.7	$\dfrac{1593.3x126.7}{3686.5} = 54.8$	-8.1	65.61	1.19
X4	7	73.3	$\dfrac{2093.2x120}{3686.5} = 68.1$	5.2	27.04	0.39
	8	46.7	$\dfrac{1593.3x120}{3686.5} = 51.9$	-5.2	27.04	0.52
X5	9	73.3	$\dfrac{2093.2x126.6}{3686.5} = 71.9$	1.4	1.96	0.03
	10	53.3	$\dfrac{1593.3x126.6}{3686.5} = 54.7$	-1.4	1.96	0.04

X6	11	86.7	$\dfrac{2093.2x133.4}{3686.5} = 75.7$	-5.3	28	0.33
	12	46.7	$\dfrac{1593.3x133.4}{3686.5} = 57.7$	5.31	28	0.48
X7	13	73.3	$\dfrac{2093.2x120}{3686.5} = 68.1$	-2.62	6.9	0.16
	14	46.7	$\dfrac{1593.3x120}{3686.5} = 51.9$	2.63	6.9	0.22
X8	15	80	$\dfrac{2093.2x153.3}{3686.5} = 87$	-1.41	2	0.02
	16	73.3	$\dfrac{1593.3x153.3}{3686.5} = 66.3$	1.42	2	0.03
X9	17	66.7	$\dfrac{2093.2x120}{3686.5} = 68.1$	7.42	55	0.83
	18	53.3	$\dfrac{1593.3x120}{3686.5} = 51.9$	-7.41	54.9	1.16
X10	19	73.3	$\dfrac{2093.2x120}{3686.5} = 68.1$	-5.3	28	0.32
	20	46.7	$\dfrac{1593.3x120}{3686.5} = 51.9$	5.31	28.1	0.48
X11	21	80	$\dfrac{2093.2x146.7}{3686.5} = 83.3$	-2.04	4.16	0.06
	22	66.7	$\dfrac{1593.3x146.7}{3686.5} = 63.4$	2.05	4.2	0.09
X12	23	60	$\dfrac{2093.2x113.3}{3686.5} = 64.3$	2.49	6.2	0.08

	24	53.3	$\dfrac{1593.3 \times 113.3}{3686.5} = 48.9$	-2.48	6.15	0.11
X13	25	40	$\dfrac{2093.2 \times 73.3}{3686.5} = 41.6$	-3.71	13.8	0.27
	26	33.3	$\dfrac{1593.3 \times 73.3}{3686.5} = 31.7$	3.72	13.8	0.4
X14	27	66.7	$\dfrac{2093.2 \times 120}{3686.5} = 68.1$	-4.21	17.7	0.22
	28	53.3	$\dfrac{1593.3 \times 120}{3686.5} = 51.9$	4.22	17.8	0.31
X15	29	80	$\dfrac{2093.2 \times 140}{3686.5} = 79.5$	8.05	64.8	0.77
	30	60	$\dfrac{1593.3 \times 140}{3686.5} = 60.5$	-8.04	64.6	1.04
X16	31	40	$\dfrac{2093.2 \times 73.3}{3686.5} = 41.6$	-1.6	2.56	0.06
	32	33.3	$\dfrac{1593.3 \times 73.3}{3686.5} = 31.7$	1.6	2.56	0.08
X17	33	73.3	$\dfrac{2093.2 \times 133.3}{3686.5} = 75.7$	-2.4	5.76	0.08
	34	60	$\dfrac{1593.3 \times 133.3}{3686.5} = 57.6$	2.4	5.76	0.1
X18	35	73.3	$\dfrac{2093.2 \times 113.3}{3686.5} = 64.3$	9	81	1.26
	36	40	$\dfrac{1593.3 \times 113.3}{3686.5} = 48.9$	-8.9	79.21	1.62
X19	37	80	$\dfrac{2093.2 \times 146.7}{3686.5} = 83.3$	-3.3	10.89	0.13

	38	66.7	$\dfrac{1593.3x146.7}{3686.5} = 63.4$	3.3	10.89	0.17
X20	39	80	$\dfrac{2093.2x153.3}{3686.5} = 87$	-7	49	0.56
	40	73.3	$\dfrac{1593.3x153.3}{3686.5} = 66.3$	7	49	0.1
X21	41	66.7	$\dfrac{2093.2x113.4}{3686.5} = 64.4$	2.3	5.29	0.08
	42	46.7	$\dfrac{1593.3x113.4}{3686.5} = 49$	-2.3	5.29	0.1
X22	43	73.3	$\dfrac{2093.2x120}{3686.5} = 68.1$	5.2	27.04	0.39
	44	46.7	$\dfrac{1593.3x120}{3686.5} = 51.9$	-5.2	27.04	0.52
X23	45	73.3	$\dfrac{2093.2x140}{3686.5} = 79.5$	-6.2	38.44	0.48
	46	66.7	$\dfrac{1593.3x140}{3686.5} = 60.5$	6.2	38.44	0.64
X24	47	60	$\dfrac{2093.2x106.7}{3686.5} = 60.6$	-0.6	0.36	0.006
	48	46.7	$\dfrac{1593.3x106.7}{3686.5} = 46.1$	0.6	0.36	0.008
X25	49	60	$\dfrac{2093.2x113.3}{3686.5} = 64.3$	-4.3	18.49	0.29
	50	53.3	$\dfrac{1593.3x113.3}{3686.5} = 48.9$	4.4	19.36	0.39

X26	51	80	$\dfrac{2093.2x133.3}{3686.5} = 75.7$	4.3	18.49	0.24
	52	53.3	$\dfrac{1593.3x133.3}{3686.5} = 57.6$	-4.3	18.49	0.32
X27	53	46.7	$\dfrac{2093.2x86.7}{3686.5} = 49.2$	-2.5	6.25	0.13
	54	40	$\dfrac{1593.3x86.7}{3686.5} = 37.5$	2.5	6.25	0.17
X28	55	73.3	$\dfrac{2093.2x133.3}{3686.5} = 75.7$	-2.4	5.76	0.08
	56	60	$\dfrac{1593.3x133.3}{3686.5} = 57.6$	2.4	5.76	0.1
X29	57	66.7	$\dfrac{2093.2x120}{3686.5} = 68.1$	-1.4	1.96	0.03
	58	53.3	$\dfrac{1593.3x120}{3686.5} = 51.9$	1.4	1.96	0.04
X30	59	73.3	$\dfrac{2093.2x126.6}{3686.5} = 71.9$	1.4	1.96	0.03
	60	53.3	$\dfrac{1593.3x126.6}{3686.5} = 54.7$	-1.4	1.96	0.04
		N = 30				$X^2 = 20.581$

From the table, it can be seen that the chi square value is χ = 20.581, whereas, the confidence level in this analysis is 95% which means that the α = 100%-95%=5% (0.05). The degree of freedom (df) is 29 from the formula df = (r -1) (c-1) = (30-1)(2-1). Moreover, the value of χ^2 for α = 5% (0.05) on the chi square distribution is 42.557. The diagram of this chi square distribution is presented below :

Figure III.1
Chi Square Diagram

H1 rejected

20.581   42.557
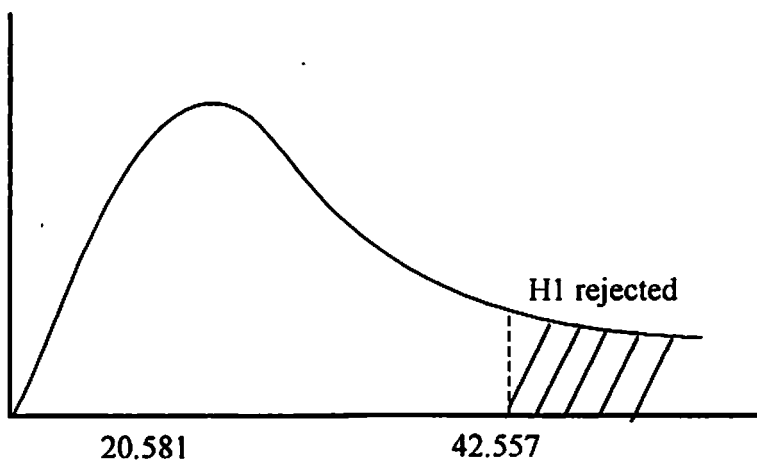
The diagram shows that the chi square (χ^2) value of the analysis (20.581) is not more than the chi square (χ^2) from the table (42.557). Thus, 20.581 is in the curve and H1 is accepted. This means that the comprehension of the students of product design engineering of picture story is better than that of written text.

III.3   Interpretation of The Data

According to the data, the scores of test I (picture story) are better than those of test II (written text). This is also revealed by the χ^2 value of the analysis ($\chi^2 = 20.581$) which is not more than the χ^2 value from the table ($\chi^2 = 42.557$). Thus, it means that the abilities of the students of product-design engineering in comprehending picture story are better than those of written text.

Through this analysis, it can also be concluded that the theory of brain lateralization can be proved. The students of product design engineering of the 10 November Institute of Engineering Surabaya (ITS) who are supposed to learn courses dealing with drawing have better scores in picture story (test I) than in written text (test II). Their frequent contacts with courses which deal with drawing is considered to be the representation of the activity of right hemisphere. This is due to some theories of brain lateralization which are mentioned by Atkinson (1987:49), O'Grady (1989:254), Gerow (1992:89), etc. They stated that the abilities in artistic things, such as drawing, are handled by the right hemisphere, whereas the abilities in language, such as reading, by the left hemisphere. Thus, roughly speaking, the students of product design engineering mostly utilize their right hemispheres. So, it is inevitable if their scores of test I (picture story) are better than those of test II (written text). Probably, it is obvious that their scores of test I (picture story) are influenced by the frequency and the sort of the courses received. The kinds of the courses they get, ordinarily deal with drawings, whereas, the frequency of their study to get in touch with this course is quite high.
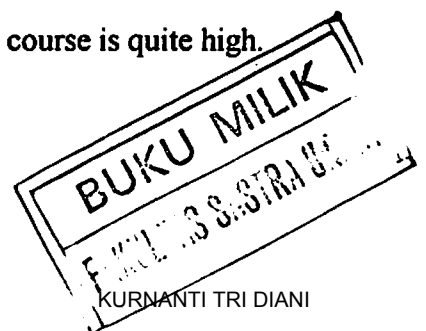
Moreover, some factors might influence the scores of the respondents in doing both tests, which are internal and external factors. The internal factors here include the respondents' conditions, their psychological and physical conditions, when doing the tests. For instances, their health, temperaments and moods which reasonably affect the respondents' concentrations. Another internal factor is the habitual activities of the respondents, i.e in reading and passing their courses. As stated above, the frequency and the kind of their courses might also highly influence the scores they gained. Furthermore, the rate of difficulty of the materials being conducted may also be regarded as one of the internal factors. However, in this study, the materials are taken from the ordinary and neutral topics. So, they do not include any specific terms which might have probably complicated the respondents. Meanwhile, the external factors might involve the place where the tests conducted such as the condition of classroom and its surroundings, whether it is quite or noisy, comfortable or uncomfortable which might infer the respondents' focus in doing the tests.

Though this study revealed a significant result, it is important then, not to judge that test I (picture story) absolutely represents the work of the right hemisphere and that test II (written text) of the left hemisphere. Thus, this hemispheric specialization is not merely intended only for a certain function. And this is due to the ways of the work of the two hemispheres. They only differ in their specialization, however, they integrate all their activities. In relation to this, each of the two hemispheres does not work independently. It is based on the notion of Levy (cited in Atkinson, 1987), which stated that differences made by

each hemisphere are seen in contrasting contributions. When a person reads a story, the right hemisphere may play a special role in decoding visual information, maintaining an integrated story structure, appreciating humor and emotional content, deriving meaning from past associations and understanding metaphor. Simultaneously, the left hemisphere plays a special role in understanding syntax, translating written words into their phonetic representations and deriving meaning from complex relations among word concepts and syntax. However, there is no activity in which one hemisphere is involved and the other is not. They probably can do the same things, but one hemisphere might do them better and faster. So, there is no absolute judgement about the lateralization of the brain in which one hemisphere solely works for specific skills. Both hemispheres work together and integrate their activities at all times.

CHAPTER IV

CONCLUSION