

THE EFFECT OF WORD CHAIN GAME TO STUDENTS' VOCABULARY MASTERY AT GRADE VIII OF SMP NEGERI 5 PADANGSIDIMPUAN

A THESIS

Submitted to the State Institute for Islamic Studies Padangsidimpuan as a Partial Fullfilment of the Requirement for the Degree of Education Scholar (S. Pd) in English

Written By:

SRI WAHYUNINGSIH Reg. Number: 15 203 00029

ENGLISH EDUCATION PROGRAM

TARBIYAH AND TEACHER TRAINING FACULTY STATE INSTITUTE FOR ISLAMIC STUDIES PADANGSIDIMPUAN 2020



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إ

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I realize this thesis can't be considered perfect without critiques and seggestions. Therefore, it is such a pleasure for me to get critiques and suggestions to make this thesis better.

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ABSTRACT

This research describes about students' problems in vocabulary mastery. It was solved by choosing an appropriate game that is Word Chain Game. There were some problems in this research: 1) Lack of motivation in learning vocabulary, 2) Lack of vocabularies, 3) difficult in memorizing a new vocabulary. The purpose of this research is to know whether there is the effect of Word Chain Game to students' vocabulary mastery at grade VIII of SMP N 5 Padangsidimpuan

The method that is used in this research is experimental research. The population of this research is all of the eight grade of SMP N 5 Padangsidimpuan that consist of 265 students. Then, the sample of the research was 2 classes, VIII 5 as experimental class that consist of 28 students and VIII 4 as control class that consist of 28 students. The data was derived from pre-test and post-test. To analyze the data, the researcher used t-test formula.

Based on the calculation of t-test, the researcher found that $t_{count} = 9.09$ and $t_{table} = 1.67356$. It means $t_{count} > t_{table} (9.09 > 1.67356)$. So, the researcher could concluded that Ha was accepted and Ho was rejected. There was the significant effect of using Word Chain Game to students' Vocabulary Mastery at grade VIII students of SMP Negeri 5 Padangsidimpuan.

Keywords: Vocabulary Mastery, Noun and Word Chain Game.

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ABSTRAK

Penelitian ini mendeskripsikan tentang pengaruh game Kata Berantai untuk meningkatkan kosa kata pada siswa kelas VIII SMP N 5 Padangsidimpuan. Ada beberapa masalah dalam penelitian ini : 1). Siswa memiliki sedikit motivasi, 2). Siswa , 3). Siswa kesulitan dalam menghapal kosa kata baru.

Metode yang digunakan dalam penelitian ini adalah penelitian eksperimen. Populasi dalam penelitian ini adalah seluruh siswa kelas VIII SMP N 5 Padangsidimpuan. Total populasi adalah 265 siswa. Lalu, sampel penelitian ini adalah dua kelas, VIII 5 sebagai kelas eksperimen yang terdiri dari 28 siswa dan VIII 4 sebagai kelas kontrol yang terdiri dari 28 siswa. Data dikumpulkan melalui pre-test dan post-test. Untuk menganalisa data, peneliti menggunakan rumus t-test.

Berdasarkan perhitungan t-test, peneliti menemukan bahwa t_{hitung} = 9.09 dan t_{table} = 1.67356. Itu artinya $t_{hitung} > t_{table}$ (9.09>1.67356). Jadi, peneliti dapat menyimpulkan bahwa Ha diterima dan Ho ditolak. Ada pengaruh yang signifikan dari penggunaan Game Kata Berantai untuk meningkatkan kosa kata pada siswa kelas VIII SMP N 5 Padangsidimpuan.

Kata kunci: Kosa Kata, Kata Benda dan Word Chain Game.

TABLE OF CONTENTS

	Page
INSIDE TITLE PAGE	i
AGREEMENT ADVISORS SHEET	ii
DECLARATION OF SELF THESIS COMPLETION	iii
AGREEMENT PUBLICATION OF FINAL TASK FORACADEMIC	
CIVITY	iv
ABSTRACT	v
SCHOLAR MUNAQOSYAH EXAMINATION	vi
LEGALIZATION OF DEAN OF FTIK	vii
ACKNOWLEDGEMENT	viii
TABLE OF CONTENTS	X
LIST OF TABLES	xi
LIST OF FIGURES	xii
LIST OF APPENDIXES	XV

CHAPTER I INTRODUCTION

A.	TheBackground of the Problem	. 1
B.	The Identification of the Problem	. 5
C.	The Limitation of the Problem	. 5
D.	The Definition of Operational Variables	. 5
E.	The Formulation of the Problem	. 6
F.	The Purposes of the Research	. 6
G.	The Significances of the Research	. 6
H.	The Outline of the Thesis	. 7

CHAPTER II THEORETICAL DESCRIPTION

A.	The Theoretical Description	8
	1. Vocabulary	8
	a. Definition of Vocabulary	8
	b. Kinds of Vocabulary	10
	c. Classification of Vocabulary	11
	d. Teaching Vocabulary	15
	e. Principle of Teaching Vocabulary	17
	2. Word Chain Game	19
	a. Definition of Word Chain Game	19
	b. The Roles of Word Chain Game to Develop Students'	
	Vocabulary Mastery	21
	c. Procedure of Word Chain Game	22

B. Conventional Strategy	
C. Review of Related Findings	
D. Framework of Thinking	
E. The Hypothesis of the Research	
CHAPTER III RESEARCH METHODHOLOGY	
A. The Place and Schedule of the Research	
B. The Research Design	
C. The Population and Sample	
1. Population	
2. Sample	
D. The Instrument of Research	32
E. The Validity and Reliability Instrument	
1. The Validity	
2. The Reliability	
F. The Technique of Collecting Data	
1. Pre-test	
2. Treatment	
3. Post-test	
G. TheTechnique of Data Analysis	
1. Requirement test	
2. Hypothesis test	

CHAPTER IV THE RESULT OF RESEARCH

A. Description of Data	41
1. The Description of Data before Using Word Chain Gam	e41
a. Score of Pre-Test Experimental Class	41
b. Score of Pre-Test Control Class	43
2. The Description of Data after Using Word Chain Game	46
a. Score of Post-Test Experimental Class	46
b. Score of Post-Test Control Class	48
3. The Description of Comparison Data of Pre-Test and	
Post-Test	53
a. The Comparison Data of Pre-Test and Post-Test in	
Experimental Class	53
b. The Comparison Data of Pre Test and Post Test in	
Control Class	54
c. The Comparison Data between Experimental and	
Control Class in Post Test	54
B. Technique of Data Analysis	55

	1. Requirement Test5	5
	a. Normality and Homogeneity Pre-Test	5
	1) Normality of Experimental Class and Control	
	Control in Pre-Test5	5
	2) Homogeneity of Experimental Class and Contro	1
	Class inPre-Test	6
	b. Normality and Homogeneity Post-Test	7
	1) Normality of Experimental Class and Control (Class
	in Post-Test5	57
	2) Homogeneity of Experimental Class and Contro	1
	Class in Post-Test	57
	2. Hypothesis Test	8
C.	Discussion	9
D.	Threats of the Research	51

CHAPTER V THE CONCLUSION AND SUGGESTION

	A. Conclusion	62
	B. Suggestion	62
_		-

REFERENCES

APPENDIXES

LIST OF TABLES

Page

Table 1	Example of Kinds of Noun13
Table 2	list of Playing Word Chain Game21
Table 3	Research Design
Table 4	Populatin of the Research
Table 5	Sample of the Research
Table 6	The Indicators of Vocabulary Mastery Test of Pre-Test
Table 7	The Indicators of Vocabulary Mastery Test of Post-Test
Table 8	The Score of Experimental Class in Pre-Test42
Table 9	Frequency Distribution of Students' Score42
Table 10	The Score of Control Class in Pre-Test44
Table 11	Frequency Distribution of Students' Score44
Table 12	The Score of Experimental Class in Post-Test46
Table 13	Frequency Distribution of Students' Score47
Table 14	The Score of Control Class in Post-Test
Table 15	Frequency Distribution of Students' Score49
Table 16	The Comparison Data of Exp. Class in Pre-Test and Post Test51
Table 17	The Comparison Data of Control Class in Pre-Test and Post Test52
Table 18	Normality & Homogeneity in Pre-Test55
Table 19	Normality & Homogeneity in Post-Test57
Table 20	Result ot T-Test from the Both Averages

LIST OF FIGURES

Figure 1	Contetual Framework	27
Figure 2	Description Data Pre-Test of Experiment Class	13
Figure 3	Description Data Pre-Test of Control Class	15
Figure 4	Description Data Post-Test of Experiment Class	17
Figure 5	Description Data Post-Test of Control Class	19
Figure 6	Comparison between Pre-Test and Post-Test in Exp. Class	51
Figure 7	Comparison between Pre-Test and Post-Test in Control Class	53
Figure 8	Comparison between Experimental and Control Class in Post-	
	Test	54

LIST OF APPENDIXES

- Appendix 1Lesson Plan of Experimental Class
- Appendix 2 Lesson Plan of Control Class
- Appendix 3 Instrument for Pre- Test before Validity
- Appendix 4 Instrument for Pre-Test after Validity
- Appendix 5 Instrument for Post- Test before Validity
- Appendix 6 Instrument for Post-Test after Validity
- Appendix 7 Key Answer
- Appendix 8 Validity of Pre Test
- Appendix 9 Table Validity of Pre-Test
- Appendix 10 Reliability of Pre Test
- Appendix 11 Reliability of Pre Test
- Appendix 12 Validity of Post Test
- Appendix 13 Table Validity of Post-Test
- Appendix 14Reliability of Post Test
- Appendix 15 Reliability of Post Test
- Appendix 16 Result of Normality Test in Pre Test
- Appendix 17 Homogeneity Test (Pre-Test)
- Appendix 18 Score of Experimental Class and Control Class Pre Test
- Appendix 19 Score of Experimental Class and Control Class Post Test
- Appendix 20 Result of Normality Test in Post Test
- Appendix 21 Homogeneity Test (Post-Test)
- Appendix 22 T-test of the Both Averages in Pre-Test
- Appendix 23 T-test of the Both Averages in Post-Test
- Appendix 24 Chi-Square Table
- Appendix 25 Z-Table
- Appendix 26 Percentage Points of the t Distribution
- Appendix 27Research Documentation

CHAPTER I

INTRODUCTION

A. Background of the Problem

Vocabulary is one of the important aspects in teaching a language. It is an essential role in creating understanding of language through what the students learning in school. It helps the students to communicate succesfully. It also has an important place to make students master the four skills in language. They are speaking, listening, reading and writing which prominant in teaching and English learning, without vocabulary students cannot master the four skills above.

The first is speaking skill. Speaking is people can communicate by having much vocabularies, so we can not speak well and have good meaning without have much vocabulary. So the first thing that must be measured by the students to be able in speaking is vocabularies.

The second is listening skill, while people do the communication, of course they want to know what the others want to communicate to them, so if they lack of vocabularies it will make them difficult in understanding what others want to communicate to them, so that why have many vocabularies is more needed to increase this skill.

The third is reading comprehension. Reading is the skill or activity of getting information from written text or book. getting information from the text is not difficult but it can be difficult if the readers do not know what is the meaning of the word in the text. So that, by having many vocabularies it will make them easier to understand what the text is about. The fourth is writing skill, as one of the productive skill in language, having many vocabularies is needed. It will help them in delivering their ideas, expressing the options and developing their ideas in writing.

In the line with the explanation above vocabulary learning is an important and indispensable part of any language learning process to mastery four skills in English. It's mean that vocabulary is need to all of the skills, like speaking and listening, students cannot speak and understanding without vocabulary. Thus, in reading and writing, students cannot write paragraph or sentence without vocabulary.

The students faced many problems in learning vocabulary, so that they are very difficult to understand all of materials that the teacher was explained,they are:

First is understanding meaning of word. Most students have found difficulties in understanding meaning of words, because they may not know it when they are learning, so that it is so hard for them could understand the lesson well, and it also might make them dissappointed and unmotivated. Besides that, they try to translate it into Bahasa Indonesia, so that they attempt look up it in dictionary.

Second is differentiating the foreign word-spelling. The students have found some similiar words and sounds in English, if they do not have much vocabulary in Engliash it might make them feel confused to differenciate it.

Third is using the words. The students have difficulties in using the words because they forgot word that has been learned before, so that they could not make a sentence well.

When the researcher asks the teacher of eighth grade of SMP Negeri 5 Padangsidimpuan, she is Hapsyah Sri Mei Siregar.¹ Hafsyah says that students had lack motivation, if the teacher gives exercise or material in class. Partly of the students at eight grade of SMP Negeri 5 Padangsidimpuan, always calm down and they did not do what have teacher given. The teacher did not know, how students have understand or not. It makes one problematic in learning english, especially in teaching vocabulary.

Students had lack vocabularies. It includes students' vocabulary enrichment. When the researcher asked students about some vocabularies, many students did not know about english vocabularies. It means that many students had less vocabulary, its also make them difficult in mastering vocabulary.

Students had difficulties in memorizing a new vocabulary because they feel english is difficult. Students tend to be bored and low participantion in english class. They did not know how to pronounce the word correctly. It makes them lazy to study English.

¹ Hapsyah Sri Mei Siregar, *English Teacher of SMP Negeri 5 Padangsidimpuan, Private Interview.*, April 05 2019.

This research used word chain Game as a media to help students to enrich their vocabulary. Carrol states that Word Chain game is a kinds of game purposing to improve the players ability in mastering vocabulary of words.² It also supported by Ten in her research that word chain game can enrich students vocabulary.³ Word chain game is a game where the players have to mention a thing based on a choosen theme simultaneously or a word game in which players come up with words that begin with the letter ended with.

Based on the explanation above, the researcher interested to use word chain game as a media in teaching vocabulary. The researcher wants to know whether Word Chain Game give significant effect to students' vocabulary mastery or not. So, this media can be used next time by the researcher herself or other teachers.

B. The Identification of the Problem

Based on the bakground above, there are some problems in vocabulary mastery at grade VIII SMP Negeri 5 Padangsidimpuan as following are:

- 1) Students had lack motivation in learning vocabulary
- 2) Students had lack vocabularies

² Carrol Lewis, "Word Chains-the Game of Subtlechanges," 2007, www.wordchains.com/faq.php.

³ Ten Nove and Melfin Lase, "The Effect of Word Chain Game on Students ' Vocabulary Mastery (An Experimental Study at Seventh Grade Students of SMP Negeri 1 Pandan 2017 / 2018 1, no. 3 (2018): 39–65,

https://journal.ipts.ac.id/index.php/LINER/article/download/.../252/%0A%0A.

3) Students had difficulties in memorizing a new vocabulary

C. The Limitation of the Problem

The researcher focus the problem on lack vocabulary of the students'. Then the strategy is limited by using word chain game. It will be focus on common noun and proper noun (fruit, profession, and animal) to solve the problem.

D. The Defenition of the Operational Variables

1. Word Chain game

Word chain is a game where its players have to mention a thing based on a chosen theme simultaneously or a word game in which players come up with words that begin with the letter or letters that the previous word ended with.

2. Students' vocabulary Mastery

Students vocabulary Mastery is students' knowladge about the word it self that use to master the skills in language such as speaking, listening, reading, writing.

E. The Formulation of the Problem

- How is the students' vocabulary mastery before using word chain game ?
- How is the students' vocabulary mastery after using word chain game ?

3. Is there a significant effect of using word chain game to students' vocabulary mastery?

F. The Purposes of the Research

- 1. To describe the students' vocabulary mastery before using word chain game.
- 2. To describe the students' vocabulary mastery after using word chain game.
- To examine whether the effect of using word chain game to students' vocabulary mastery is significant or not.

G. The Significances of the Research

The result of this research gave the benefit to some categories below:

- 1. Theoritically, The result of the research contribute useful information for the next research with the smiliar problem of vocabulary skill achievemant.
- 2. Practically, To the English teacher, can give the contribution in teaching and learning process and can apply it effectively.

H. Outline of the Thesis

The systematic of this research is devided into five chapter. Each chapter consist of many sub chapters are follow: chapter one, it consist of background of the problem, identification of the problems, limitation of the problem, defenition of the operational variables, formulation of the problem, purpose of the research, significances of the research. Chapter two, it consists of the theoritical description, which the sub chapters consist of theoretical description of vocabulary and word chain game. Then, review of related findings, conceptual of frame work and hypothesis.

Chapter three, it consists of research methodology which consist of time and place of the research, research design, population and sample, instrument of collecting data, validity and reability, procedures of the research and the last is the techniques of analyzing data.

Chapter four, it consists of the result of the research talking about the analysis of data. It consist of description of data, hypothesis testing, discussion and the threats of reserach.

Finally, chapter five consists of conclusion that give conclusion about the result of research and suggestion to principal of the school and other research.

CHAPTER II

THEORITICAL DESCRIPTION

A. Theoretical Description

1. Vocabulary

a. The Definition of vocabulary

Vocabulary plays an important role because it appears in every language skills. In mastering the four skills in English, the learners should master the vocabulary as the basic skill firstly. Oxford learner's pocket dictionary states that "vocabulary is all the words that a person knows or uses".¹ It means Vocabulary is all the words in a language, vocabulary also lists of words with their meaning. Moreover, in cambridge dictionary states that "vocabulary is all the words that exist in a particular language or subject".² It means that vocabulary is the most importance of language, students who rich in vocabulary will be successful in all language skills : speaking, writing, listening and reading, but who low in vocabulary will get trouble in those skills.

Vocabulary is a collection of words in english language.³ It means that vocabulary is a component of language which gives information or explanation in a language terms. The other

¹ A S Hornby, Oxford Advanced Learner's Dictionary of Current English (Oxford: Oxford University Press, 1995).

² Elizabeth Walker, *Cambridge Learner's Dictionary* (England: Cambridge University Press, 2004).

³ Howard Jackson, Words, Meaning and Vocabulary (London: Casell, 2000), 118.

defenition Vocabulary is part of relationship on language.⁴ It is the main element of language because human will do nothing for increasing language into practice without any words or vocabulary. it is relevant with Schmitt statement, he says that with grammar very little can be conveyed, and without vocabulary nothing can be conveyed". While Penny Ur stated that "Vocabulary is the words that teach in the foreign language".⁵ It can be said that vocabulary is one of the language components that must be learned in learning English.

Richard and Renandya in their book said that vocabulary is a core component of language proficiency and provides much of the basis for how well learners can speak, listen, read, and write.⁶ Without an extensive vocabulary and strategies for acquiring new vocabulary, learners often achieve less than their potential and may be discouraged from making use of language learning opportunities around them such as listening to the radio, listening to native speakers, using the language in different contexts, reading, or watching television, and how to speak English well.

⁴ Dian Rakhmawati, "The Influence of Vocabulary Journal in Teaching Students' Vocabulary Mastery," *Smart* 2, no. 1 (2016): p.53, http://ejournal.stkipmpringsewu-lpg.ac.id/index.php/smart/article/view/148.

⁵ Penny Ur, *A Course in Language Teaching Practice and Theory* (New York: Cambridge University Press, 1991), 71.

⁶ Jack C.Richards and Willy A Renandya, *Methodology in Language Teaching An Antalogy of Current Practice* (Cambridge: Cambridge University Press, 2002), p.255.

Based on the definition above the researcher can conclude that vocabulary is important part of language. Without vocabulary, the language cannot produce, so we cannot speak anything.

b. Kinds of Vocabulary

Many kinds of vocabulary can be used to tell some people about their knowledge or their vocabulary. Another word, kinds of vocabulary can be used to identify the level of someone; who is in the beginner level, who is in the intermediate level, or who is in the advance level. So, kinds of vocabulary are one of the knowledge to know how far their ability in vocabulary.

According to Stuart in Mofareh, there are two kinds of vocabulary, as follow:

Receptive vocabulary or passive vocabulary it is words that learners recognize and understand when they are used in context, but which they cannot produce. It is vocabulary that learners recognize when they see or meet in reading text but do not use it in speaking and writing.

It can be concluded that receptive vocabulary is the

students recognizes and understand when they occur in a context,

but which they cannot produce correctly.

Productive vocabulary, it is the words that the learners understand and can pronounce correctly and use constructively in speaking and writing. it involves what is needed for receptive vocabulary plus the ability to speak or write at the appropriate time. therefore, productive vocabulary can be addressed as an active process, because the learners can produce the words to express their thoughts to others.⁷

It can be conclude that productive vocabulary is words which the students know and can pronounce it correctly. These two kinds of vocabulary that learners recognize and understand when they are used in contex.

c. Classification of Vocabulary

Vocabularies are classified into function and contents of words. The function words are closed class, we cannot add to the preposition or auxiliaries or modals, or any structure words of language. The content words, on other hands can be added to any time new scientific advances make new words and communication about new invention necessary. It means that vocabulary is words that are part of language, but words can be combined and cannot be combined, just stand alone. Thus, to make comprehending about word more clearly. The words also still has some classification, such as nouns, pronoun, verb, adjective, preposition, conjunction, and interjections. Wren and Martin say that words are divided into different kinds of classes, called "Parts of Speech", thus parts of speech are eight in number, they are 1) noun 2) adverb 3) adjective 4) preposition 5) pronoun 6) conjunction 7) verb 8) interjection.⁸

⁷ Mofareh Alqahtani, "The Importance Of Vocabulary In Language Learning And How To Be Taught," *International Journal of Teaching and Education* III, no. 3 (2015): 21–34, https://doi.org/10.20472/TE.2015.3.3.002.

⁸Wren and Martin, *High School English Grammar and Composition* (Jakarta: Persada Rao, 1990), p.3.

Based on the researcher said before the focus on this research that only in common and proper noun. Noun is a word used as the name of all things, we know about, have, see, hear, taste, smell, or feel. This includes words for people, things, words for thing we know exist but cannot touch, and an idea or a quality of mind is defined as a noun. Many nouns can be counted. These nouns have plural forms, which in English usually mean they have an "s" add to the end, according to certain set spelling and pronunciation patterns. Other noun cannot be counted. They do not have plural forms that are used with singular verb, and they are called "noncount" nouns.

Howard Jackson said that nouns as things, including people, animals, objects, abstract ideas, and feeling.⁹That means noun is one of the most important parts of speech. Its arrangement with the verb helps to form the sentence core which is essential to every complete sentence. In addition, noun may function as the chief or head words in many structures of modification. Some noun may belong to more than one of types given below:

- a) Common noun is a name given in common to every person or thing of the same class or kind
- b) Proper noun is the name of some particular person or place. Proper nouns are always written with a capital letters at the beginning.
- c) Collective noun is the name of collection of things or person.

⁹ Howard Jackson, *Good Grammar for Students* (London: Sage Publication, 2005), 18.

- d) Concrete noun is the name of thing that can be touched or seen. Concrete noun also is a word for a physical object that can be perceived by sense, it can see, touch, smell, the object.
- e) Abstract noun is a word for a concept. It is ideas that exist in our mind only. It is usually the name of quality or state, action, or state considered apart from the object.
- f) Countable noun is the name of things that can be counted or divided into singular or plural. A countable noun can usually be made plural by the addition of "s or es".
- g) Uncountable noun is the name of thing that cannot be counted or divided into singular or plural. An uncountable noun is not used in the plural. Material noun is the name of material or substance out of which things are made.¹⁰

To make definition of kinds of noun above more clearly, the

researcher gives table of examples about kinds of noun below:

Example of Kinds of Noun		
Kinds of Noun	Example	
1. Common Noun	Boy, woman, girl, officer, poet, city, village, place, traveller, dramatist, etc.	
2. Proper Noun	Roni, Restu, Netherlands, Sydney, Jogjakarta, Grand Omega, etc.	
3. Collective Noun	Crowd, mob, team, herd, army, fleet, jury, family, nation, parliament, committee, poultry, cattle, gentry, class.	
4. Concrete Noun	Room, sun, girl, boy, windows, etc.	
5. Abstract Noun	Freedom, liberty, though, joy, sorrow, love, death, goodness, kindness, childhood, voice, ability, etc.	

Table. 1

¹⁰ Jayanthi Dakhsina Murthy, *Contemporary English Grammar* (New Delhi: Shivam Printers, 2003), p.5-10.

6. Countable Noun	Arrow, blood, boat, bone, bridge, man, woman, etc.
7. Uncountable Noun	Ice, coffee, tea, ink, liberty, justice, life, truth, beauty, money, etc.
8. Material Noun	Gold, silver, butter, paper, ice, tea, money, steel, milk, car, etc.

Based on definition above, the researcher give conclusion that in concrete noun has been included; proper that include common noun, and in common noun include collective noun, and another kinds that is included in proper noun is countable, uncountable, and material noun. In abstract noun has been included uncountable noun. Thus, in each kinds of noun relate one to one other kinds, but to make noun more clearly to comprehend, noun is divided in several parts like as above.

In this research, the researcher only focus on common and proper noun;

1. Common Noun,

According to Howard Sargeant, words that given to name people, things, and places in general are called as the common noun.¹¹ So, common noun is name given in common to every person or thing of the same class or kind such as boy, doctor, officer, teacher, town, place.

¹¹ Howard Sargaent, *Basic English Grammar For English Language Learner* (United Stated: Saddleback Educational Publishing, 2007).

Common noun does not use capital letter at the beginning of the word.

Example : I see the **teache**r in the class. Teacher in this sentence is common.

2. Proper Noun.

According to Gordon Winch, proper noun is a name especially person, place, or things.¹² It means proper noun is the name of particular person place, or thing. The first letter of word is capitalized such as Isma, Indonesia, Manggo, Saturday.

Example: we are **Indonesian.** Indonesian in this sententence is proper noun.

d. Teaching Vocabulary

Teaching English vocabulary is integrated into the four skills of the language. Another hand, vocabulary holds significant role in mastery of the four skills of the language. In the teaching of English or any foreign language, teaching vocabulary is one of the important aspects because the unlimited number of vocabulary in a language. Teaching vocabulary should be presented interactively in teaching of the four language skills. It was impossible to learn a language without words. Therefore, vocabulary is the most important subject in teaching and learning process.

¹² Gordon Winch, *The Foundation Grammar Dictionary* (Australia: New Frontier Publishing, 2004).

In teaching vocabulary, teachers also must provide opportunities to organize vocabulary. It is in meaningful ways to make it easier to learn by students. Into the bargain, teacher also must focus on vocabulary."¹³ It means that, in teaching vocabulary, the teachers give vocabulary a high profile in the syllabus and the classroom so that students can see its importance and understand that learning a language is not just about learning grammar.

Additionally, there is a lot to learn about vocabulary in terms of its range, the sheer number of words and phrases to learn, and the depth of knowledge students' needs to know about each vocabulary item. Materials can help students in two broad areas: First, they need to present and practice in natural contexts the vocabulary that is frequent, current, and appropriate to learners' needs. Second, materials should help students become better learners of vocabulary by teaching different techniques and strategies they can use to continue learning outside the classroom.

Furthermore, the types of words that taught to students' matters. The all words that to teach to students must directly to students, so the goal is to select the most productive words to teach. The most productive words are the position from which

¹³ Jeanne McCarten, *Teaching Vocabulary, Lesson From the Corpus, Lesson for the Classroom,* (United State America, Cambridge University Press, 2007), p. 19-23.

teachers develop the heuristic of word tiers.¹⁴ In teaching vocabulary, there are some guidelines for the communicative treatment of vocabulary instruction in teaching vocabulary:

- 1) Allocate specific class time to vocabulary learning.
- 2) Help students to learn vocabulary in context
- 3) Play down the role of bilingual dictionaries
- 4) Encourage students to develop strategies for determining the meaning of words.¹⁵

These guidelines above show that when the teachers start the teaching vocabulary, the teachers must pay attention all of the aspects that are related with teaching vocabulary.

e. Principle of Teaching Vocabulary

To make teaching vocabulary more effectively, we have some principle in teaching vocabulary. According to Tricia Hedge, there are number of principle for the teaching of vocabulary:16

- 1) Developing a variety of techniques for the teaching of meaning. It means the teacher will need to make decisions about which words are useful to retain and choose techniques accordingly.
- 2) Encouraging the development of effective strategies. Therefore, building on what we know of the strategies

¹⁴ Michel F.Graves., et.all., *Teaching Vocabulary to English Language Learner*, (United State America: Catherine Snow, 2013), p. 11.

¹⁵ H. Douglas Brown, Teaching by Principles An Interactive Approach in Language Pedagogy (America: Prentice Hall Regents, 1998), 365. ¹⁶Tricia Hedge, *Teaching and Learning in the Language Classroom*, (United Kingdom:

Oxford University Press, 2000), p. 125-135.

used by good language learners for vocabulary acquisition, it is possible to involve students in activities which help them to develop new strategies as well as strengthen existing ones.

- 3) Exposing learners to vocabulary through reading and training lexical inferencing. It means that teacher suggest to learner for reading unfamiliar words involves a degree of problem solving this will help with the retention of the word. It is also useful to remember the distinction between inferencing for the purpose of fluent reading and inferencing as strategy in vocabulary acquisition.
- 4) Teaching the effective use of dictionaries. While teacher can take on a number of useful roles with regard to dictionary, because the dictionary has come into focus as an important classroom and personal resource.
- 5) Evaluating the vocabulary component of coursebooks. It means that contemporary coursebooks vary greatly in the degree to which they show a concern with vocabulary acquicition.
- Teaching vocabulary explicitly through a range of activity types. Moreover, direct vocabulary instruction is useful.
- 7) Developing resources for vocabulary teaching.

Based on the explanation above researcher concluded that in teaching vocabulary teacher should have a variety of techniques to make students easy in understanding meaning of vocabulary. Teacher also evaluate the vocabulary component and develop an effective strategies in teaching vocabulary.

2. Word Chain Game

a. Definition of Word Chain Games

Game is one of several way that very easy to apply in process of learning because game is more interesting and can give the easy way to the students to recall or memorize English vocabulary. Wright, Betteridge, Buckby state that "Game is an activity which is entertaining and engaging, often challenging and an activity in which the learners play and usually interact with others".¹⁷Using game as a technique is not a new thing. Many researchers had done their researches by using classroom games in teaching English for young learners. According to Kuzu and Ural "when games and education are combined, it can be educative and education environments can be entertaining".¹⁸The learners who learned with the use of games, gain positive attitudes and can be more motivated while learning.

¹⁷ M. A. Wright, Betteridge, D. Bucky, *Second Language Learning and Teaching* (New York: Cambridge University Press, 2006).

¹⁸ A. Kuzu and N. Ural, *Games Choices and Factor Effecting on Game Choicee of Game Players* (Anadolu University, 2010).
Word Chain Game is one of the games used in teaching language learning for English as a Second Language. Carrol in Ten states that Word Chain game is a kinds of game purposing to improve the players ability in mastering vocabulary of words.¹⁹ This is a game where the players have to mention a thing based on a choosen theme simultaneously or a word game in which players come up with words that begin with the letter ended with, its relevant with Holden :

"This is a variation on the Japanese game 'shiritori'. Students try to connect the words by the way they are spelled, matching the last letter of a word with the first letter of the following word. For example: career, relocate, executive, entertain, neighbour, where each new word has as its first letter the last letter of the previous word. They can use any words that they know, but try to include in the chain all the new words that they are learning."²⁰

Meanwhile, Based on the opinions, it can be said that word chain game is one of the games can be used by the teacher in language teaching process. Firmansyah also mentions that Word chain game is well-known game that has been applied in language teaching class for a long time.²¹ "Word chain" is a well-known game and has been used in many language classes for a long time.

Word chain game specially used in vocabulary teaching

learning process. When this game is played in a class, the first

¹⁹ Carrol Lewis, "Word Chains-the Game of Subtlechanges," 2007, www.wordchains.com/faq.php.

 ²⁰ William R Holden, "Learning To Learn : 15 Vocabulary Acquisition Activities, Tips and Hints," *Modern English Teacher* 8, no. 1 (1999): 45.
 ²¹ Achmad Yanuar Firmansyah, "Applying The ' Word Chain ' Game To Teach

²¹ Achmad Yanuar Firmansyah, "Applying The ' Word Chain ' Game To Teach Descriptive Speaking To The Eight Graders In Smpn 26 Surabaya," 2009, 1–7, https://jurnalmahasiswa.unesa.ac.id/index.php/retain/article/view/12982.

player is most likely the teacher and is followed by the rest of the class. The theme can be decided based on the level of the player (player's grade and vocabulary mastery).

In other words, the difficulty of this game is adjustable. Examples of the themes which are commonly used are animals, fruit and vegetable, city and country around the world, food, and so forth. An axample chain for word animal would be :

	List of playing word chain game			
No	Fruits	Profession	Animals	
1	Guava	Accountant	Bir d	
2	Avocado	Technician	Dog	
4	Orange	Novelist	Giraffe	
	Elderberry	Tailor	Elephent	

Table 2List of playing word chain game

b. The Roles of Words Chain Game to Develop Students' Vocabulary Mastery

In playingWord Chain Game, students try to connect one of English words to another English word. By applying this game, the students will recall all of English words in their mind or the English words that they have memorized or they have known before. Word Chain Game also helps students to explore the linkages among the English words, understand the meaning of the words, and remember the meaning of that words. According to Eichel,²² in playing Word Chain Game, each of words does not allow to be repeated. It means in playing this game, students will produce the new English words and they will hear the pronounce of the new words from their friends or from the other students. In other words, they will be familiar and know the words they have never heard before.

To help students to play this game related to the theme that has been given by the teacher, the teacher can be the first player and this teacher can say the first word that related to the theme that has been chosen. In other words, when this game is applied in the teaching learning process, the teacher needs to help the students. The teacher helps the students to understand the rule of word chain game and how the word chain game used in teaching and learning English vocabulary.

c. The Procedure of Word Chain Game

Word chain game takes an important roles from the teachers and the students. Without the teacher and the students, this game will not be able to apply in the context of teaching language learning.

According to Sperling ,the ways to increase vocabulary by using word chain game are:

1) dividing the classroom into some groups;

²² Eichel C, "Word Chain and Games Critical Thinking Activities," 2014, https://www.ebay.com/p/Critical-Thinking-Activities-Brain-Teasers-Who.

2) dividing the whiteboard into the members of groups;
3) one of the students from each group comes up to the whiteboard and give them time to write a word;
4) the next student from each team comes up and writes another word that begins with the last letter of the previous word;
5) giving a time limit about 5 until 10 minutes;

6) the group which has the most words written on the board correctly wins.²³

When the word chain game is played in a class, the first player is most likely the teacher and is followed rest of the class. In the class, the teacher can control the stuedents to play this game related to the theme has been given by the teacher, the teacher also can to be the first player that followed by the all of the students in the class. The researcher concluded the procedure of word chain is the steps to make students understand how to play it in the classroom.

B. Conventional strategy

Conventional strategy is the strategy used by the teachers based on mutual agreement in a school. Conventional strategy is the strategy or the way used by the teachers to teach the vocabulary to the students. Based on the explanation above, the researacher concluded that conventional method is the strategy used by the teacher to teach learning materials based on arragement at school. The procedure used by the English teacher at SMP Negeri 5 Padangsidimpuan is explain the subject metter and give the home work.

²³D. Sperling, "W-O-R-D-c-H-a-I-N'. Dave's ESI," 2009, http://www.eslcafe.com/idea/index.cgi?display:109713289519798.txt.

C. Review of Related Findings

Many researchers were talking about students' vocabulary mastery and there were some researchers that have been used Word Chain Game. Related to this research, some researchers had been done as follow:

First, Jerni Ariyanti Gultom in her research concluded that there was the improvement of students' vocabulary mastery by using Word Chain Game.²⁴ The researcher found that the mean of pre-test in experiment class was 73.75 and control class was 68.125. Mean of posttest in experiment class was 84.625 and control class was 76. it was found that the observation was 2.73, where the t table was 1.994 for $\alpha = 0.05$. The observation was higher than t table (2.73 1.994), so Ha was accepted while Ho was rejected. It means that there was significant effect of using word chain game.

Second, Rosmini Yanti in her research showed that there was the significant effect of Word Chain Game to students' vocabulary mastery.²⁵ The tests showed that the mean of post-test score (71,8) was higher than the mean of pre-test (63,8). In answering the questionnaire most of the students gave the good respond in answering questionnaire. So, the application of Word Chain Game is better, effective, and efficient than conventional technique.

²⁴ Jerni Ariyanti Gultom, "The Effect of Using Word Chain Game on The Students' Vocabulary Mastery at Seventh Grade of MTS 3 Menteri Bingkat" (uinsu, 2018), http://repository.uinsu.ac.id/3906/.

²⁵ Rosmini Yanti, "The Implementation of Word Chain Game to Improve The Mastery of English Vocabulary" (Uin Ar- Raniry, 2017), https://repository.ar-raniry.ac.id/1912/.

Third, Zahrotul Izzah in her research concluded that there was the improvement of students' vocabulary mastery by using word chain game.²⁶ The mean score in the first cycle was 64 and second cycle was 76.1. It shows the word chain game can improve students' vocabulary mastery.

Fourth, Ten Nove Melfin Lase in her research showed that there was the significant effect of Word Chain Game to students' vocabulary mastery.²⁷ It shows that count is higher than T table (2.33 > 2.04). that means word chain game can enrich students vocabulary mastery.

The differences of this research from the previous studies is the selecting of material and grade that will be integrated in the classroom. It can be seen that selecting appropriate material and technique can be implemented in practicing and enrich students' vocabulary knowledge. This research will focus on noun using the word chain game that will be conducted at junior high school with eight grade students as the participants to know whether the word chain game can affect students' vocabulary when they are learning vocabulary.

D. Framework

²⁶ Zahrotul Izzah, "The Use of Word Chain Game to Improve Vocabulary Mastery of Grade Students at SMP N 3 Kalibagor" 2015, http://repository.ump.ac.id/46/2/ Zahrotul.pdf.

²⁷ Ten Nove and Melfin Lase, "The Effect of Word Chain Game on Students 'Vocabulary Mastery (An Experimental Study at Seventh Grade Students of SMP Negeri 1 Pandan 2017 2018" 1, no. 3 (2018): 39–65, https://journal.ipts.ac.id/index.php/LINER/article/download/.../252/%0A%0A.

Vocabulary is all about words the words in a language or a special set of words you are trying to learn. Many people are difficult in memorizing new vocabulary, so do students of SMP Negeri 5 Padangsidimpuan especially in the second grade. They have some problems in vocabulary mastery, for instance difficult to memorize new vocabulary, lack of vocabularies, and have lack motivation. Word Chain Game is a game that can help students to enrich students vocabulary. So by applying this technique, the students will be easier to remember the new vocabulary. The researcher illustrates the conceptual framework as follow:



Figure 1 Conceptual Framework

E. Hypotheses of the Research

Hypotheses are typically derived from theories or from knowledge gained while reviewing the related literature, which often leads the researcher to expect a certain finding.²⁸ The hypothesis of this research are:

- 1. There is the significant effect of Word Chain Game to students' vocabulary Mastery at grade VIII SMP Negeri 5 Padangsidimpuan.
- There is no significant effect of Word Chain Game to students' vocabulary Mastery at grade VIII SMP Negeri 5 Padangsidimpuan.

²⁸ L. R. Gay, Geoffrey E. Mills, and Peter Airasian, *Educational Research Competencies for Analysis and Applicatins*, Tenth Edition (America: Pearson, 2012), p.70, http://englishlangkan.com/2017/01/21/download-free-ebook-education-research-l-r-gay-2012-pdf/.

CHAPTER III

RESEARCH METHOD

A. Place and Time Schedule of the Research

This research has been conducted at SMP Negeri 5 Padangsidimpuan. It is located on jln. Perintis Kemerdekaan No. 61 Padangsidimpuan Selatan. It was done from April 2019 until Desember 2019.

B. Research Design

The kind of this research is quantitative research with experimental method. The researcher divides this research into two variables, those are independent (Word Chain Game) and dependent (Students' Vocabulary Mastery). The researcher use two classes in this research. One of the classes is taught with Word Chain Game and it called as experimental class or as a treatment. Meanwhile the other class is taught with Conventional Technique and called as control class.

Based on using control and experimental class, the research design that is used true experimental design'. The design which used is Pretest-Posttest Control Group Design. The pretest–posttest control group design requires at least two groups, each of which is formed by random assignment. Both groups are administered a pretest, each group receives a different treatment, and both groups are posttested at the end of the study. Posttest scores are compared to determine the effectiveness of the treatment.

Table 3Research Design

Class	Pre- test	Treatment	Post- test
Experiment		Word Chain	
Class	\checkmark	Game	\checkmark
Control Class		Conventional	
	\checkmark	Strategy	\checkmark

C. Population and Sample

1. Population

The population as the data sources of this research are all of the second grade students of SMP Negeri 5 Padangsidimpuan that consist of 9 classes.

Table 4The Population of the Grade VIII Students in SMP Negeri 5Padangsidimpuan

No	Class	Students
1	VIII-1	32
2	VIII-2	31
3	VIII-3	31
4	VIII-4	28
5	VIII-5	28
6	VIII-6	28
7	VIII-7	29
8	VIII-8	29
9	VIII-9	29
	JUMLAH	265

2. Sample

In this research, the researcher chose two classes as a sample. The classes are divided into experimental class and control class. The research used random sampling to take the sample. To know the homogeneity of the samples, researcher do homogeneity and normality test. Normality test is used to know whether the data of research is normal or not. The researcher use normality test with using *Chi Square* formula, as follow: ¹

$$x^{2} = \sum \left(\frac{(f_{o} - fe)2}{fe} \right)$$

Where: x^2 = value of Chi Square f_o = observed frequency f_e = expected frequency

To calculate the result of *Chi Square*, it was used significant level 5% (0,05) and degree of freedom as big as total of frequency was lessened 1 (df= k-1). If result $x^2_{count} < x^2_{table}$. So, it can be said that the data is distributed normal.

Homogeneity test is used to know whether control class and experimental class have the same variant or not. If both classes are same, it can be called homogenous. The researcher use homogeneity test with using Harley test, as follow:²

¹ Gay, Mills, and Airasian, *Educational Research Competencies for Analysis and Applicatins*.

² Agus Irianto, Statistik Konsep Dasar Dan Aplikasinya (Jakarta: Kencana, 2009), p.276.



Based on the explanation above, the researcher give the pre-test to the class that similar ability in English to know the normality and homogeneity of the sample.

Sample is a part of population which will be researched. In a research, the imformation about population is gain by using sample.

Table 5Sample of research

No	Class	Sample
1	VII-4	25
2	VII-5	28
Total		53

D. The Instrument for Collecting Data

In this research, the researcher uses test as the instrument to collect the data of students' vocabulary mastery. The test that used before validity is 25 items. The researcher only used 20 items after validity. The test that used in this research is multiple choice test consist of four option a, b, c, and d.

Table 6	
The Indicator of Vocabulary	(pre-test)

No	Indicator	Number of Item	Total Item	Score	Total
					Score
1.	Common		10	5	50
	Noun	2,3,5,7,8,14,17,18,19,20			
2.	Proper		10	5	50
	Noun	1,4,6,9,10,11,12,13,15,16			
Total Score					100

 Table 7

 The Indicator of Vocabulary Mastery (post-test)

No	Indicator	Number of Item	Total Item	Score	Total Score
1.	Common		10	5	50
	Noun	7,8,10,11,13,14,18,19,2			
		0			
2.	Proper	Part II	10	5	50
	Noun	1,2,3,4,5,6,9,12,15,16,1			
		7,			
	Total Score				100

E. The Validity and Reability of Instrument

1. The Validity

In this research, the researcher used item validity. It is concerned with whether the test items are relevant to the measurement of the intended content area.³ The formula of r point biserial can be used as follow:

$$r_{pbi=\frac{M_{p-M_t}}{SD_t}}\sqrt{\frac{p}{q}}$$

³ Gay, Mills, and Airasian, *Educational Research Competencies for Analysis and Applicatins*.

Where:

- : coefficient item validity r_{pbi}
- M_p : mean score
- \mathbf{M}_{t} : mean score of the total score
- SD_t : Standard Deviation of the total score
- : Presentation of the right answer of the item tested validity р
- : Presentation of the wrong answer of the item tested validity.⁴ q

2. The Reliability

An instrument of the research must be reliable. To get the reliability of the test, the researcher uses K-R. 20 formula. The formula is as follow:

$$\mathbf{R}_{11} = \left(\frac{k}{k-1}\right) \left(\frac{S_{t^2} - \sum pq}{S_{t^2}}\right)$$

Where:

- : Reliability of the instrument R_{11}
- Ν : Total of question
- St : Variants total
- : Total of the result times p and q $\sum pq$
- : Proportion of Subject who is right Answer р
- : Proportion of Subject who is Wrong Answer⁵ q

⁴ Anas Sudijono, *Pengantar Statistik Pendidikan* (Jakarta: Raja Grafindo Persada, 2008),

p.258. ⁵ Suharsimi Arikunto, *Dasar-Dasar Evaluasi Pendidikan*, Kedua (Jakarta: Bumi Aksara, 2012), p.115.

Reliability is a good character of the test that refers to the consistency of the measurement. The test is reliable if $r_{count} > r_{table}$ by using formulation K-R.20.

F. The Procedures of the Research

In collecting data the researcher use test for students. The kind of the test is multiple choice test. In giving the test, it divide into two kinds; pre-test and post-test. The procedure as bellow:

1. Pre-test

It is a test that is given before doing the treatment to the students. It is needed to know the students' ability in experiment and control class before the research give the treatment to experiment class. It is also used to find out the homogeneity and normality level of the sample. The researcher uses some steps in giving pre-test. They are:

- a. Prepare 20 items of the multiple choice test.
- b. Distribute the test paper to both of classes; experimental and control class.
- c. Explain what the students need to do.
- d. Give the times to the students to answer the questions.
- e. Collect the students' test paper.
- f. Check the answer and counts the students' score.
- 2. Treatment

The treatment will be done after pre- test. The experimental class received the treatment thought by word chain game, while the control class taught by conventional strategy. The experimental class is taught by using word chain game, while the control class is taught by conventional technique. The researcher uses some procedures in treatment class. They are:

- a. For the beginning, researcher starts the learning activity with greeting.
 Then, ask the students to take a pray. Next, explain the indicators and give them motivation.
- b. Giving the example of word chain game to the students.
- c. Introduce the word chain game and explain how to play it.
- d. Give feed back to students' task.

3. Post-test

After giving treatment, the researcher conduct a post-test. The function is to know the difference score of experiment and control class and the effect of treatment, whether it has an effect or not. The researcher uses some steps in giving pre-test. They are:

- a. Prepare 20 items of the multiple choice test.
- b. Distribute the test paper to both of classes; experimental and control class.
- c. Explain what the students need to do.
- d. Give the times to the students to answer the questions.
- e. Check the answer and counts the students' score.

G. Technique of Data Analyzing

Experimental research design was done through experimental class and control class. After experimental process, two of classes were tested by using technique of data analysis as follow:

1. Requirement test

a. Normality Test

The researcher used normality test with using Chi - Quadrate formula, as follow:

$$x^{2} = \sum \left(\frac{f_{o} - f_{h}}{f_{h}} \right)$$

Where:

 x^2 = Chi-Quadrate

 f_o = Frequency is gotten from the sample/result of observation (questioner).

 f_h = Frequency is gotten from the sample as image from frequency is hoped from the population.

To calculate the result of chi-quadrate, it used significant level 5% (0, 05) and degree of freedom as big as total of frequency is lessened 1 (dk = k-1).

b. Homogeneity Test

Homogeneity test is used to know whether control class and experimental class have the same variant or not. If both of classes are same, it is can be called homogeneous. Homogeneity is the similarity of variance of the group will be compared. So, the homogeneity test has function to find out whether the data is homogeneous or not. It uses Harley test, as follow:⁶

 $F = \frac{The \ biggest \ variant}{The \ smallest \ variant}$

Where:

 n_1 = Total of the data that bigger variant

 n_2 = Total of the data that smaller variant

Hypothesis is rejected if $F \le F_2^1 a(n_1-1)$ (1=n₂-1), while if F_{count} > F_{table} hypothesis is accepted. It determined with significant level 5% (0.05) and dk numerator was (n₁-1), while dk deminators is (n₂-1).

To test whether variants of both homogenous samples, variants equality test, that is:

$$F = \frac{the \ biggest \ variants}{the \ smallest \ variant}$$

Here, after comparing to the F_{table} , its criterion is: If F calculating<F table, then both samples are homogeneous.

2. Hypothesis Test

The technique in analyzing the data was used by t-test, because it is aimed to examine the difference of two variables. Such examination performed both on pre-test and post-test score from the experimental

⁶. Agus Irianto, *Statistik Konsep Dasar* p. 276.

class and control class. The hypothesis test stated as: there is a significant effect of using Word Chain Game on students' vocabulary mastery ($\mu_{1>}\mu_{2}$) and there is no significant effect of using Word Chain Game on students' vocabulary mastery ($\mu_{1=}\mu_{2}$).

From explanation above, to test hypothesis researcher used formula as follows:⁷

$$Tt = \frac{M_{1} - M_{2}}{\sqrt{\left(\frac{\sum x_{1}^{2} + \sum x_{2}^{2}}{n_{1} + n_{2} - 2}\right)\left(\frac{1}{n_{1}} + \frac{1}{n_{2}}\right)}}$$

Where:

3.

Tt : The value which the statistical significance

M 1: The average score of experimental class

M₂ : The average score of control class

 X_1^2 : Deviation of experimental class

 X_2^2 : Deviation of control class

 n_1 : Number of experimental

 n_2 : Number of control

But if the data is not normal and homogenous, the formula that must be used to test hypothesis is Chi-Quadrate. The formula is as follow:

$$x^{2} = \sum \left(\frac{f_{o} - f_{h}}{f_{h}} \right)$$

⁷. Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan Praktek Edisi Revisi II*, (Jakarta: Rineka Cipta, 1993), p. 269.

Where:

 $x^2 = Chi-Quadrate$

 f_o = Frequency is gotten from the sample/result of observation (questioner).

 f_h = Frequency is gotten from the sample as image from frequency is hoped from the population.

To calculate the result of *Chi-Quadrate*, it is used significant level 5% (0,05) and degree of freedom as big as total of frequency is lessened 3 (dk= k-3). If result $x^2_{count} < x^2_{table}$. So, it can be concluded that data is distributed normally.

CHAPTER IV

THE RESULT OF RESEARCH

As mentioned in earlier chapter, in order to find out the effect of using Word Chain Game on students' vocabulary mastery, the researcher had calculated the data using pre-test and post-test. The researcher used the formulation of T-test to test the hypothesis. Next, the researcher described the data as follow:

A. The Description of Data

1. The Description of Data before Using Word Chain Game

a. Score of Pre-test Experimental Class

In pre-test of experimental class, the researcher calculated the result that had been gotten by the students in answering the question (test). The score of pre-test experimental class can be seen in the following table:

Total	1085
Highest score	55
Lowest score	20
Mean	36.24
Median	39.48
Modus	40.5
Range	35
Interval	6
Standard deviation	9.84
Variants	97.45

Table 8The Score of Experimental Class in Pre-test

Based on the above table the total score of experimental class in pre-test was 1085, mean was 36.24, standard deviation was 9.84,

variants was 97.45, median was 39.48, range was 30, modus was 40.5, interval was 6. The researcher got the highest score was 55 and the lowest score was 20. It can be seen on appendix 16 and 17.

Then, the computed of the frequency distribution of the students' score of experimental class can be applied into table frequency distribution as follow:

No	Interval	Frequency	Percentages
1	20 - 25	4	14%
2	26 - 31	3	11%
3	32 - 37	5	18%
4	38-43	6	21%
5	44 - 49	5	18%
6	50 - 55	5	18%
i = 6		28	100%

Table 9Frequency Distribution of Students' Score

From the table above, the students' score in class interval between 20 - 25 was 4 students (14%), class interval between 26 - 31 was 3 students (11%), class interval between 32 - 37 was 5 students (18%), class interval between 38 - 43 was 6 students (21%), interval between 44 - 49 was 5 students (18%), and the last class interval between 50 - 55 was 5 students (18%).

In order to get description of the data clearly and completely, the researcher presents them in histogram on the following figure:



From the histogram of students' score of experimental class in pre test shown that the lowest interval 20 - 25 was 4 students and highest interval 50 - 55 was 5 students. Histogram also shown that the highest frequency in interval 38 - 43 was 6 students.

b. Score of Pre-Test Control Class

In pre-test of control class, the researcher calculated the result that had been gotten by the students in answering the question (test). The score of pre-test control class can be seen in the following table:

Total	1050
Highest score	55
Lowest score	20
Mean	31.5
Median	36.48
Modus	33.9
Range	35
Interval	6
Standard deviation	11.22
Variants	100.92

Table 10The Score of Control Class in Pre-test

Based on the above table the total score of control class in pretest was 1050, mean was 31.5, standard deviation was 11.22, variants was 100.92, median was 36.48, range was 35, modus was 33.9, interval was 6. The researcher got the highest score was 55 and the lowest score was 20. It can be seen on appendix 16 and 17.

Then, the computed of the frequency distribution of the students' score of control class could be applied into table frequency distribution as follow:

No	Interval	Frequency	Percentages
1	20 - 25	5	18%
2	26 - 31	4	14%
3	32 - 37	6	21%
4	38 - 43	3	11%
5	44 - 49	5	18%
6	50 - 55	5	18%
	<i>i</i> = 6	28	100%

Table 11Frequency Distribution of Students' Score

From the table above, the students' score in class interval between 20 - 25 was 5 students (18%), class interval between 26 - 31 was 4 students (14%), class interval between 32 - 37 was 6 students (21%), class interval between 38 - 43 was 3 students (11%), class interval between 44 - 49 was 5 students (18%), and the last class interval between 50 - 55 was 5 students (18%).

In order to get description of the data clearly and completely, the researcher presents them in histogram on the following figure:



From the histogram of students' score of control class in pre test shown that the lowest interval 20 - 25 was 5 students and highest interval 50 - 55 was only 5 students. Histogram also shown that the highest frequency in interval 32 - 37 was 6 students.

2. The Description of Data After Using Word Chain Game

a. Score of Post-Test Experimental Class

In post-test of experimental class, the researcher calculated the result that had been gotten by the students in answering the question (test) after the researcher did the treatment by using Word Chain Game. The score of post-test experimental class can be seen in the following table:

Total	1650
Highest score	80
Lowest score	45
Mean	60.1
Median	58.18
Modus	58.48
Range	35
Interval	6
Standard deviation	10.98
Variants	80.29

Table 12The Score of Experimental Class in Post-test

Based on the above table the total score of experiment class in post-test was 1650, mean was 60.1 standard deviation was 10.92, variants was 80.29, median was 58.18, range was 35, modus was 58.48, interval was 6. The researcher got the highest score was 80 and the lowest score was 45. It can be seen on appendix 18 and 19.

Then, the computed of the frequency distribution of the students' score of experiment class can be applied into table frequency distribution as follow:

No	Interval	Frequency	Percentages
1	45 - 50	6	21%
2	51 - 56	6	21%
3	57 - 62	7	25%
4	63 - 68	5	18%
5	69 – 74	2	7%
6	75 - 80	2	7%
	<i>i</i> = 6	28	100%

Table 13Frequency Distribution of Students' Score

From the table above, the students' score in class interval between 45 - 50 was 6 students (21%), class interval between 51 - 56 was 6 students (21%), class interval between 57 - 62 was 7 students (25%), class interval between 63 - 68 was 5 students (18%), class interval between 67 - 74 was 2 students (7%), and the last class interval between 75 - 80 was 2 students (7%).

In order to get description of the data clearly and completely, the researcher presents them in histogram on the following figure:



From the histogram of students' score of experimental class in post test shown that the lowest interval 45 - 50 was 6 students and highest interval 75 - 80 was only 2 students. Histogram also shown that the highest frequency in interval 57 - 62 was 7 students.

b. Score of Post-Test Control Class

In post-test of control class, the researcher calculated the result that had been gotten by the students in answering the question (test) after the researcher taught the vocabulary mastery by using Conventional Technique. The score of post-test control class can be seen in the following table:

Total	1160
Highest score	60
Lowest score	25
Mean	37.82
Median	40.52
Modus	39.5
Range	35
Interval	6
Standard deviation	10.14
Variants	92.32

Table 14The Score of Control Class in Post-test

Based on the above table the total score of control class in posttest was 1160, mean was 37.82, standard deviation was 10.14, variants was 92.32, median was 40.52, range was 35, modus was 39.5, interval was 6. The researcher got the highest score was 60 and the lowest score was 25. It can be seen on appendix 20 and 21.

Then, the computed of the frequency distribution of the students' score of control class could be applied into table frequency distribution as follow:

Table 15Frequency Distribution of Students' Score

No	Interval	Frequency	Percentages
1	25 - 30	5	18%
2	31 – 36	5	18%
3	37 - 42	6	21%
4	43 - 48	5	18%

5	49 - 54	3	11%
6	55 - 60	4	14%
<i>i</i> = 6		28	100%

From the table above, the students' score in class interval between 25 - 30 was 5 students (18%), class interval between 31 - 36 was 5 students (18%), class interval between 37 - 42 was 6 students (21%), class interval between 43 - 48 was 5 students (18%), class interval between 49 - 54 was 3 students (11%), class interval between 54 - 60 was 4 students (14%).

In order to get description of the data clearly and completely, the researcher presents them in histogram on the following figure:



From the histogram of students' score of control class in post test shown that the lowest interval 25 - 30 was 5 students and highest interval 55 - 60 was only 4 students. Histogram also shown that the highest frequency in interval 40 - 44 was 6 students.

3. The Description of Comparison Data of Pre-Test and Post-Test

a. The Comparison Data of Pre-Test and Post-Test in Experimental

Class

The comparison data between pre-test and post-test of experimental class can bee seen in the following table:

Description	Pre-Test	Post-Test
Total	1085	1650
Highest score	55	80
Lowest score	20	45
Mean	36.24	60.1
Median	39.48	58.18
Modus	40.5	58.48
Range	35	35
Interval	6	6
Standard deviation	9.84	10.98
Variants	97.45	80.29

Table 16The Comparison Data of Experimental Class
in Pre-test and Post-Test

Based on students' answers in experimental of pre-test and posttest, the researcher has calculated the students' score and most of students both of classes were low in reading. Experimental class consisted of 28 students (VIII 5). The lowest score in pre-test was 20 whereas the highest score was 55 and the lowest score in post-test was 45 whereas the highest score was 80. In order to get the pre-test and post-test data description of experimental class clearly and completely, the researcher presents the histogram on the following histogram:



From the histogram above, Pre-test frequency of students' score from 20 up to 27 was 4; 28 up to 35 was 8; 36 up to 43 was 6 students, 44 up to 51 was 7, 52 up to 59 was 3 students. In post-test, the frequency of students' score from 44 up to 51 was 6; 52 up to 59 was 6; and 60 up to 67 was 12; 68 up to 75 was 3, 76 up to 83 was 1 student. The histogram shows that the highest interval (72-84) was 1 student and the lowest interval (20 – 32) was 4 students. So the students' scores of experimental class in post-test was higher than pre-test.

b. The Comparison Data of Pre-test and Post Test in Control Class

The comparison data between pre-test and post-test of control class can bee seen in the following table:

in Pre-test and Post-Test			
Description	Pre-Test	Post-Test	
Total	1050	1160	
Highest score	55	60	
Lowest score	20	25	
Mean	31.5	37.82	
Median	36.48	40.52	
Modus	33.9	39.5	
Range	35	35	
Interval	6	6	
Standard deviation	11.22	10.14	
Variants	100.92	92.32	

Table 17The Comparison Data of Control Classin Pre-test and Post-Test

Based on students' answers in control class of pre-test and posttest has calculated the students' score and most of students both of classes were low in reading. Control class consisted of 28 students (VIII 4). The lowest score in pre-test was 20 whereas the highest score was 55 and the lowest score in post-test was 25 whereas the highest score was 60.

In order to get the pre-test and post-test data description of control class clearly and completely, the researcher presents the histogram on the following histogram:



From the histogram above, Pre-test frequency of students' score from 20 up to 32 was 9; 33 up to 45 was 14; 46 up to 58 was 5 students. In post-test, the frequency of students' score from 20 up to 32 was 5; 33 up to 45 was 16; 46 up to 58 was 5; 59 up to 71 was 2 students.

c. The Comparison Data between Experimental and Control Class in Post-Test

Based on students' answers in post-test in experimental and control class, the researcher has calculated the students' score and most of students both of classes increased. Experimental class consisted of 28 students (VIII 5), the lowest score was 45 whereas the highest score was 80. Then, most of students got raising score and their score increased very significant. Control class consisted of 28 students (VIII 4), the lowest score was 20 whereas the highest score was 55. Studens' score increased too but not significant.

In order to get easier description of data, the researcher presented them in histogram. It can be seen on following histogram:



From histogram above, in experimental class, the frequency of students' score from 45 up to 54 was 6 ; 55 up to 64 was 13; 65 up to 74 was 7; 75 up to 84 was 2 students. In control class, the frequency of students' score from 25 up to 34 was 5; 35 up to 44 was 11; 45 up to 54 was 8; 55 up to 64 was 4 students.

B. Technique of Data Analysis

- 1. Requirement Test
 - a. Normality and Homogeneity Pre-Test
 - 1) Normality of Experimental Class and Control Class in Pre-

Test

	Table 18	
Normality	and Homogeneity	in Pre-Test

Class	Normality Test		Homogeneity Test	
	X _{count}	X _{table}	f _{count}	f _{table}
Experiment Class	-4.08	11.070	1.03< 2.66	
Control Class	-4.23	11.070		

Based on the above table researcher calculation, the score of experimental class Lo = -4.08 < Lt = 11.070 with n = 28 and control class Lo = -4.23 < Lt = 11.070 with n = 28, and real level α 0.05. Cause Lo< Lt in the both class. So, H_a was accepted. It means that experimental class and control class were distributed normal. It can be seen in appendix 16 and 17.

2) Homogeneity of Experimental Class and Control class in Pre-Test

The coefficient of $F_{count} = 1.03$ was compared with F_{table} . Where F_{table} was determined at real α 0.05, and the different numerator dk = n-1 = 28-1 = 27 and denominator dk n-1 = 28-1 = 27. So, by using the list of critical value at F distribution is got $F_{0.05}$ = 2.66. It showed that F_{count} 1.03< F_{table} 2.66. So, the researcher
concluded that the variant from the data of the Students' Vocabulary Mastery at SMP Negeri 5 Padangsidimpuan by experimental class and control class was homogenous. The calculation can be seen on the appendix 17.

b. Normality and Homogeneity Post-Test

1) Normality of Experimental Class and Control class in Post-

Test

Class	Normality Test		Homogeneity Test	
	X _{count}	X _{table}	f _{count}	f_{table}
ExperimentalClass	-12.65	11.070	1 14 < 2 66	
Control Class	0.62	11.070	1.14< 2.00	

Table 19Normality and Homogeneity in Post-Test

Based on the table above researcher calculation, the score of experiment class Lo = -12.65 < Lt = 11.070 with n = 28 and control class Lo = 0.62 < Lt = 11.070 with n = 28, and real level α 0.05. Cause Lo< Lt in the both class. So, H_a was accepted. It means that experimental class and Control class were distributed normal. It can be seen in appendix 20 and 21.

2) Homogeneity of Experimental Class and Control class in Posttest

The coefficient of $F_{count} = 1.14$ was compared with F_{table} . Where F_{table} was determined at real α 0.05, and the different numerator dk = n-1 = 28-1 = 27 and denominator dk n-1 = 28-1 = 27. So, by using the list of critical value at F distribution is got $F_{0.05}$ = 2.66. It showed that F_{count} 1.14< F_{table} 2.66. So, the researcher concluded that the variant from the data of the Students' Vocabulary mastery at SMP Negeri 5 Padangsidimpuan by experimental class and Control class was homogenous. The calculation can be seen on the appendix 21.

2. Hypothesis Test

After calculating the data of post-test, researcher found that posttest result of experimental class and control class is normal and homogenous. Based on the result, researcher used parametric test by using T-test to analyze the hypothesis. Hypothesis alternative (H_a) of the research was "There is the significant effect of using Word Chain Game to Students' Vocabulary Mastery at grade VIII students of SMP Negeri 5 Padangsidimpuan". Hyphotesis null (Ho) of the research was "There is no significant effect of using Word Chain Game to Students' Vocabulary Mastery at grade VIII students of SMP Negeri 5 Padangsidimpuan". Ha is accepted if t_{count} is higher than t_{table}. In this case, the researcher found that t_{count}>t_{table} which means that there was the significant effect of using Word Chain Game to Students' Vocabulary Mastery at grade VIII students of SMP Negeri 5 Padangsidimpuan. The calculation can be seen on the appendix 22 and 23.

Result of 1-test from the Doth Averages			
Pre-test		Post-test	
t _{count}	t _{table}	t _{count}	t _{table}
-1.80	1.67356	9.09	1.67356

Table 20Result of T-test from the Both Averages

 $\mathrm{H}_{\mathrm{a}}: \mu_{1} > \mu_{2}$

Where:

 $H_a: \mu_1 > \mu_2$ "There was the significant effect of using Word Chain Game to Students' Vocabulary Mastery at grade VIII of SMP Negeri 5 Padangsidimpuan".

Based on researcher calculation, researcher found that t_{count} 9.09 while t_{table} 1.67356 with opportunity $(1 - \alpha) = 1 - 5\% = 95\%$ and $dk = n_1 + n_2 - 2 = 28 + 28 - 2 = 54$. Cause $t_{count} > t_{table}$ (9.09>1.67356), it means that hypothesis H_a was accepted and H_0 was rejected. So, there was the significant effect of using Word Chain Game to Students Vocabulary Mastery at grade VIII of SMP Negeri 5 Padangsidimpuan".

C. Discussion

Based on the result of this research, the researcher has proved what had been stated by Holden that "This is a variation on the Japanese game 'shiritori'. Students try to connect the words by the way they are spelled, matching the last letter of a word with the first letter of the following word. For example: career, relocate, executive, entertain, neighbour, where each new word has as its first letter the last letter of the previous word. They can use any words that they know, but try to include in the chain all the new words that they are learning.¹ The theory stated that Word Chain Game is an appropriate technique for vocabulary, and in this research, the researcher found that the mean score of students' vocabulary mastery before using Word Chain Game was 37.82 and after using Word Chain Game was 60.1. It means there was the effect of using Word Chain Game on vocabulary mastery.

The result above supported the previous research by some researchers. First, Jerni Ariyanti Gultom on her thesis got the mean score in pre-test was 73.75 and in post was 84.625.² Next, Rosmini Yanti on her thesis she got mean score of pre-test was 63.8 after applying Word Chain Game the mean score of post-test was 71.8.³ Then, Zahrotul Izzah on her thesis got the mean score in first cycle was 64 and the second cycle was 76.1.⁴ It shows the Word Chain can improve students' vocabulary mastery.

Meanwhile, the researcher got the mean score of pre-test of the experimental class was 36.24. The mean score of pre-test result was lower than Jerni Ariyanti Gultom, Rosmini Yanti and Zahrotul Izzah's result. From the above description, it can be seen that the highest mean score was gotten by Jerni Ariyanti Gultom where the mean score in pre-test was 73.75 and the lowest mean score of pre-test of the experimental group was gotten by the researcher on this thesis where the mean score of pre-test was 36.24.

¹ Holden, "Learning To Learn : 15 Vocabulary Acquisition Activities, Tips and Hints."

² Gultom, "The Effect of Using Word Chain Game on The Students' Vocabulary Mastery at Seventh Grade of MTS 3 Menteri Bingkat."

³ Yanti, "The Implementation of Word Chain Game to Improve The Mastery of English Vocabulary."

⁴ Zahrotul Izzah, "The Use of Word Chain Game to Improve Vocabulary Mastery of Grade Students at SMP N 3 Kalibagor."

Then, for the post-test result the researcher got the mean score of posttest of the experimental class was 60.1. The mean score of post-test result was lower than Jerni Ariyanti Gultom, Rosmini Yanti and Zahrotul Izzah's result. From the above description, it can be seen that the highest mean score was gotten by the Jerni Ariyanti Gultom where the mean score in post test was 84.625 and the lowest mean score of post-test of the experimental group was gotten by Researcher where the mean score of post-test was 60.1.

From the above explanation, there was the increasing from the pre-test score to post-test score after using the game among the related findings. Jerni Ariyanti Gultom got the increasing 10.87, Rosmini Yanti got the increasing 8, and Zahrotul Izzah got the increasing 12.1. Meanwhile the researcher got the increasing was 22.28.

Based on the result, the researcher has got the effect of using Word Chain Game on students' vocabulary mastery. Jerni Ariyanti Gultom, found that $t_{count} = 2.73 > t_{table=} 1.994$. The researcher also found that t_{count} is higher than t_{table} where t_{count} was 9.58 and t_{table} was 1.67356 (9.09 >1.67356). It can be seen among the researches that the using of Word Chain Game gave the effect to students' vocabulary mastery especially at grade VIII Students of SMP Negeri 5 Padangsidimpuan. It means the theory has been proved where the students able to mastering the vocabulary. Therefore, Word Chain Game has given the significant effect to the research that has been done by the researcher or the other researcher who mentioned in related finding and Word Chain Game is highly effective to help the English teacher in teaching learning process especially in teaching vocabulary.

D. Threats of the Research

The researcher found the threats of the research as follows:

- The students were not serious in answering the pre-test and post-test.
 Some of them still were cheating. It made the answer of the test was not pure because they did not do it by themselves.
- 2. The students were noisy while the learning process. They were not concentrating in following the learning process. Some of them talked to their friends and some of them did something outside the teacher's rule.
- 3. The learning implementation is not effective because of the limited time.

CHAPTER V

CONCLUSION AND SUGGESTION

A. Conclusion

Based on the result of the research, the conclusions of this research are:

- Students' vocabulary mastery at grade VIII SMP Negeri 5 Padagsidimpuan before using Word Chain Game were still low. It can be seen from the students' mean score of pre-test was 36.24 in experimental class and 31.5 in control class.
- Students' vocabulary mastery at grade VIII SMP Negeri 5 Padangsdimpuan after using Word Chain Game had higher score. It can be seen from the students' mean score of post-test was 60.1 in experimental class and 37.82 in control class.
- 3. It is found that t_{count} was higher than t_{table} 9.09 > 1.67356 which means H_a was accepted. Hence, there was significant effect of using Word Chain Game to students' vocabulary mastery at grade VIII of SMP Negeri 5 Padangsidimpuan.

B. Suggestion

The researcher got much information in English teaching and learning after finishing this research. From this research, researcher saw some things need to be improved. It makes the researcher give some suggestions, as follow:

- For the English teacher, it is hoped to use Word Chain Game in teaching vocabulary. This research and others proved that Word Chain Game was effective to be applied in classroom.
- For the students, it is hoped to use Word Chain Game because it can make them to be able to memorize the vocabulary.
- 3. For the next researcher, this research can help the other researcher who will conduct further research in the same topic. The other researcher can get the information from this experimental research, even do a comparison between this research and another with the similar variable.
- 4. For the English lecturer, it is hoped to teach this game so that the university students who will become teachers can apply this game while they are teaching vocabulary.

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CURRICULUM VITAE

A. Identity

Name	: Sri Wahyuningsih
Reg. No	: 1520300029
Place / Birthday	: Manggala Sakti / April 02 nd , 1997
Religion	: Islam
Address	: Desa Keritang, Kec. Kemuning, Kab.
	Indragiri Hilir, Riau

B. Parents

Father's name	: Alm. Ibrahim Situmeang
Mother's name	: Almh. Rosliana Pane

C. Educational Background

1.	Elementary School	: SD N 011 Sempang (2009)
2.	Junior High School	: MTSN Darul Istiqomah Selensen (2012)
3.	Senior High School	: MA Darul Istiqomah Selensen (2015)
4.	Institute	: IAIN Padangsidimpuan (2020)

Appendix1 Control Class

RENCANA PELAKSANAAN PEMBELAJARAN (RPP)

Sekolah	: SMP N 5 Padangsidimpuan
Mata Pelajaran	: Bahasa Inggris
Kelas	: VIII
Semester	: I(Satu)
Aspek/ Sub Skill	: Vocabulary
Alokasi Waktu	: 2 X 45 Minutes
Peneliti	: SRI WAHYUNINGSIH

:

A. Kompetensi Inti

- 1. Menghayati dan mengamalkan ajaran agama yang dianutnya.
- 2. Menghayati dan mengamalkan perilaku jujur, disiplin, tanggungjawab, peduli (gotong royong, kerjasama, toleran, damai), santun, responsif dan pro-aktif dan menunjukkan sikap sebagai bagian dari solusi atas berbagai permasalahan dalam berinteraksi secara efektif dengan lingkungan sosial dan alam serta dalam menempatkan diri sebagai cerminan bangsa dalam pergaulan dunia.
- 3. Memahami, menerapkan, menganalisis pengetahuan faktual, konseptual, prosedural berdasarkan rasa ingin tahunya tentang ilmu pengetahuan, teknologi, seni, budaya, dan humaniora dengan wawasan kemanusiaan,

kebangsaan, kenegaraan, dan peradaban terkait penyebab fenomena dan kejadian, serta menerapkan pengetahuan prosedural pada bidang kajian yang spesifik sesuai dengan bakat dan minatnya untuk memecahkan masalah.

4. Mengolah, menalar, dan menyaji dalam ranah konkret dan ranah abstrak terkait dengan pengembangan dari yang dipelajarinya di sekolah secara mandiri, dan mampu menggunakan metoda sesuai kaidah keilmuan.

B. Kompetensi dasar

- 3.6 Menerapkan fungsi sosial, struktur teks, dan unsur kebahasaan teks interaksi transaksional lisan dan tulis yang melibatkan tindakan memberi dan meminta informasi terkait noun, dan mampu menyambung kosa kata noun sesuai dengan konteks penggunaannya.
- 4.6 Menyusun teks interaksi transaksional, lisan dan tulis, pendek dan sederhana yang melibatkan tindakan memberi dan meminta informasi terkait noun, fungsi sosial, struktur teks, dan unsur kebahasaan yang benar dan sesuai konteks.

C. Indikator

Pengetahuan

3.6.1Mengidentifikasi noun

3.6.2Menemukan kosa kata baru dalam bentuk noun

:

Keterampilan

4.6.1Siswa dapat mengidentifikasi kosa kata baru dalam bentuk4.6.2 Menengetahui macam-macam noun

D. **Objective**

Siswa mampu membedakan kosa kata dalam bentuk noun

- E. Material : Noun (common noun and proper noun)
- F. Learning strategy : Conventional Strategy

G. Langkah-langkah Kegiatan :

Pertemuan	Guru menyapa siswa dalam Bahasa Inggris		
pertama	Guru memeriksa kehadiran siswa		
Pendahuluan	• Guru mengaitkan materi pembelajaran dengan pengalaman		
(10')	peserta didik atau pembelajaran sebelumnya		
	Guru menyampaikan tujuan pembelajaran		
	• Guru mendemontrasikan sesuatu yang terkait dengan tema		
	• Guru menyampaikan kemampuan yang akan dicapai peserta		
	didik		
	• Guru menyampaikan rencana kegiatan		
	Mongomoti		
Kegiatan	Mengamati		
Inti (60')	• Guru memberikan materi concrete noun (common and		
	proper noun), abstract noun, serta material noun dengan		
	bantuan object gambar dari buku pelajaran dan sekitar		
	ruangan kelas.		
	• Guru memberikan penjelasan mengenai perbedaan dari		
	ketiga jenis <i>noun</i> tersebut.		
	• Guru memberikan satu kata kunci/ key word, dan		
	menyuruh siswa secara individu untuk mencari kata-kata		
	ana saja yang berhubungan dengan <i>key word</i> tersebut		
	• Setelah itu guru meminta siswa untuk menggolongkan		
	• Setelah hu, gutu meminta siswa untuk menggolongkan		
	kata-kata yang teran ditemukan itu termasuk jems <i>noun</i>		
	apa ?		
	• Untuk lebih mengingatkan siswa terhadap <i>new</i>		
	vocabularies itu serta perbedaan jenis noun tersebut, guru		
	memberi stimulasi terhadap siswa.		
	Menanya		

	Dengan bimbingan guru siswa menggali informasi dengan
	mengajukan pertanyaan mengenai hal-hal yang berhubungan
	dengan noun
	Mengumpulkan Informasi
	• Dengan bimbingan guru siswa mempelajari pola kalimat
	yang diberbentuk noun
	• Dengan bimbingan guru siswa mempelajari cara
	penggunaan noun
	Mengolah Informasi
	• Dengan bimbingan guru siswa berlatih menggunakan pola
	kalimat noun
	Mengomunikasikan
	Siswa mencari kosa kata tentang noun
Kegiatan	• Guru dan siswa melakukan refleksi pembelajaran
Penutup	• Guru memberikan tulisan
(10')	• Guru melaksanakan tindak lanjut dengan memberikan arahan
	kegiatan berikutnya dan tugas pengayaan
Pertemuan	Guru menyapa siswa dalam Bahasa Inggris
ke 2	Guru memeriksa kehadiran siswa
Pedanuluan	
(10)	
Kegiatan	Guru mengulang kembali pelajaran sebelumnya dan
inti (60)	melanjutkan ke materi selanjutnya
	• Guru memberikan soal

	Siswa menjawab soal yang diberikan
Kegiatan	Guru mengumpulkan hasil kerja siswa
Penutup	• Guru menutup pertemuan dengan hamdalah dan salam
(10)	

F. Sumber Belajar:

- a. Buku teks yang relevan
- b. Alat peraga
- c. kamus

G. penilaian

a.	Tekhnik	: Merespon Pertanyaan Secara	Tertulis
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b. Bentuk : Pertanyaan Tertulis

:

c. Instrumen : Terlampir

H. Pedoman Penilaian :

- a. Jumlah Skor Maksimal x 5 = 20
- b. Nilai Maksimal = 100
- c. Nilai Siswa = <u>Skor Perolehan</u> x100 Skor Maksimum

Mengetahui, 2019 Guru b,inggris Padangsidimpuan,

Mahasiswa peneliti

Hapsyah Sri Mei Siregar S.Pd

<u>Sri wahyuningsih</u>

NIP. 19670503 199103 2 005

NIM. 15 203 00029

Kepala sekolah SMP N 5 Padangsidimpuan

<u>Jamali, S,Pd</u> NIP. 19680626 199412 1 001 Appendix 2 Experimental Class

RENCANA PELAKSANAAN PEMBELAJARAN (RPP)

(1117)

Sekolah	: SMP N 5 Padangsidimpuan
Mata Pelajaran	: Bahasa Inggris
Kelas	: VIII
Semester	: I(Satu)
Aspek/ Sub Skill	: Vocabulary (Noun)
Alokasi Waktu	: 2 X 45 Minutes
Peneliti	: SRI WAHYUNINGSIH

:

H. Kompetensi Inti

- 5. Menghayati dan mengamalkan ajaran agama yang dianutnya.
- 6. Menghayati dan mengamalkan perilaku jujur, disiplin, tanggungjawab, peduli (gotong royong, kerjasama, toleran, damai), santun, responsif dan pro-aktif dan menunjukkan sikap sebagai bagian dari solusi atas berbagai permasalahan dalam berinteraksi secara efektif dengan lingkungan sosial dan alam serta dalam menempatkan diri sebagai cerminan bangsa dalam pergaulan dunia.
- 7. Memahami, menerapkan, menganalisis pengetahuan faktual, konseptual, prosedural berdasarkan rasa ingin tahunya tentang ilmu pengetahuan, teknologi, seni, budaya, dan humaniora dengan wawasan kemanusiaan, kebangsaan, kenegaraan, dan peradaban terkait penyebab fenomena dan kejadian, serta menerapkan pengetahuan prosedural pada bidang kajian

yang spesifik sesuai dengan bakat dan minatnya untuk memecahkan masalah.

 Mengolah, menalar, dan menyaji dalam ranah konkret dan ranah abstrak terkait dengan pengembangan dari yang dipelajarinya di sekolah secara mandiri, dan mampu menggunakan metoda sesuai kaidah keilmuan.

I. Kompetensi dasar

- 3.6 Menerapkan fungsi sosial, struktur teks, dan unsur kebahasaan teks interaksi transaksional lisan dan tulis yang melibatkan tindakan memberi dan meminta informasi terkait noun, dan mampu menyambung kosa kata noun sesuai dengan konteks penggunaannya.
- 8.6 Menyusun teks interaksi transaksional, lisan dan tulis, pendek dan sederhana, yang melibatkan tindakan memberi dan meminta informasi terkait noun, fungsi sosial, struktur teks, dan unsur kebahasaan yang benar dan sesuai konteks.

J. Indikator

Pengetahuan

3.6.1Mengidentifikasi noun

3.6.2Menemukan kosa kata baru dalam bentuk noun

Keterampilan

4.6.1 Menengetahui macam-macam noun

:

4.6.2 Mampu mennyambung kosa kata baru dari huruf terakhir kata sebelumnya.

K. **Objective**

Siswa mampu menbedakan kosa kata dalam bentuk common dan proper noun Melalui Word Chain Game siswa mampu menemukan kosa kata baru

L. Material : Noun (common noun and proper noun)

M. Learning strategy :Word Chain Game

N. Langkah-langkah Kegiatan :

Pertemuan	Guru menyapa siswa dalam Bahasa Inggris
pertama	Guru memeriksa kehadiran siswa
Pendahuluan	• Guru mengaitkan materi pembelajaran dengan pengalaman
(10')	peserta didik atau pembelajaran sebelumnya
	Guru menyampaikan tujuan pembelajaran
	• Guru mendemontrasikan sesuatu yang terkait dengan tema
	Guru menyampaikan kemampuan yang akan dicapai peserta
	didik
	Guru menyampaikan rencana kegiatan
Kegiatan	Mengamati
Inti (60')	• Dengan bimbingan guru siswa mengamati beberapa
	langkah-langkah dalam permainan word chain game
	1. Membagi murid menjadi 4 grup.
	2. Membagi papan tulis 1 per grup
	3. Salah satu murid pada setiap grup maju kedepan
	untuk menuliskan 1 kata, contohnya Apple
	4. Selanjutnya, siswa yg lain menuliskan kata dari
	huruf terakhir apple
	5. Guru memberi waktu sekitar 5-10 menit
	6. Murid yang banyak menjawab dengan benar
	pemenangnya
	Menanya
	Dengan bimbingan guru siswa menggali informasi dengan
	mengajukan pertanyaan mengenai hal-hal yang berhubungan

	dengan noun									
	Mengumpulkan Informasi									
	• Dengan bimbingan guru siswa mempelajari pola kalimat									
	yang diberbentuk noun									
	• Dengan bimbingan guru siswa mempelajari cara									
	penggunaan noun									
	Mengolah Informasi									
	• Dengan bimbingan guru siswa berlatih menggunakan pola									
	kalimat noun									
	Mengomunikasikan									
	Siswa bermain word chain game dengan menggunakan noun									
Kegiatan	• Guru dan siswa melakukan refleksi pembelajaran									
Penutup	• Guru memberikan tulisan									
(60')	• Guru melaksanakan tindak lanjut dengan memberikan arahan									
	kegiatan berikutnya dan tugas pengayaan									
Pertemuan	Guru menyapa siswa dalam Bahasa Inggris									
ke 2	• Guru memeriksa kehadiran siswa									
Pedahuluan										
(10)										
Kegiatan	Guru mengulang kembali pelajaran sebelumnya dan									
inti (60)	melanjutkan ke materi selanjutnya									
	• Guru memberikan soal									
	• Siswa menjawab soal yang diberikan									
Kegiatan	• Guru mengumpulkan hasil kerja siswa									

Penutup	• Guru menutup pertemuan dengan hamdalah dan salam
(10)	

O. Sumber Belajar :

- d. Buku teks yang relevan
- e. Alat peraga
- f. kamus

P. Penilaian :

- a. Tekhnik : Merespon Pertanyaan Secara Tertulis
- b. Bentuk : Pertanyaan Tertulis
- c. Instrumen : Terlampir

Q. Pedoman Penilain :

- a. Jumlah Skor Maksimal x 5 : 20
- b. Nilai Maksimal : 100
- c. Nilai Siswa : <u>Skor Perolehan</u> x 100 Skor Maksimum

Mengetahui, 2019 Guru b.inggris Padangsidimpuan,

Mahasiswa peneliti

Hapsyah Sri Mei Siregar S.Pd NIP. 19670503 199103 2 005

<u>Sri wahyuningsih</u> NIM. 15 203 00029

Kepala sekolah SMP N 5 Padangsidimpuan

<u>Jamali, S,Pd</u> NIP. 19680626 199412 1 001

Sa Ch 1.	ying Basmallah be noose the most ap The meaning of <i>l</i>	Instrument f efore doing the propriate answ Rat?	or pre-test h <i>test</i> ver! (<i>Pilihlah</i>	efore validity nJawabanyang	paling tepat!)	
	a. Tikus	b. Sar	ang c. K	Luda d. S	linga	
2.	Below are includ	ed in common r	ioun, except.	.?		
	a. Parrot	b. Cou	untry c. H	andphone	d. Bag	
3.	The English of Sa	upir?				
	a. Driver	b. Tea	cher c. S	oldier d. N	urse	
4.	Parrot, Eagle, Ch	icken, Dove, an	d Crow are i	ncluded in	.?	
	a. Common Not	un b. Abs	stract Noun	c. Uncount	able Noun	d.
	Proper Noun					
5.	The meaning of <i>I</i>	Headmaster?				
	a. Guru	b. Penj	aga Sekolah	c. Pegawai	d. Kepala Seł	colah
6.	The Eagle sea is in	ncluded in	?			
	a. Common Not	un b. Abs	stract Noun	c. Uncount	able Noun	d.
	Proper Noun					
7.	Manager, Actor, a	and Doctor are in	ncluded in	noun.		
	a. Common	b. Abs	stract c. U	Incountable	d. Proper	
8.	The meaning of I	Dentist?				
	a. Dokter Gigi	b. Pera	iwat c. G	uru d. Po	etani	
9.	Manngo, Orange	e, and Apple are	included in.	noun.		
	a. Common	b. Abstract	c. Uncount	able d. Pr	roper	
10	. Below are includ	ed in proper not	in, except?			
	a. Shark	b. Dol	phin c. L	ecturer d. F	rog	
11	. The Dolphin is	nou	in?			
	a. Common	b. Abs	stract c. U	Incountable	d. Proper	
12	. Where is proper i	noun from these	words?			

а	ı. Fish	b. Animal	c. Fruit	d. Tea	cher
13. V	What is the meaning of s	eal?			
а	. Anjing laut	b. Paus	c. Hiu	d. Lun	nba-lumba
14. 7	The English of <i>paus</i>	?			
а	. Shark	b. Seal	c. Seagull	d. Crał	0
15. E	Below are some nouns w	hich are includ	ed proper noun	, except	?
а	. Snake	b. City	c. Fish	d. Eag	le
16. V	What is the meaning of S	Seller?			
а	a. Pedagang	b. Pemulung	c. Artis	d. Foto	ografer
17. F	Fish is the sea animal, so	fish is include	d in n	oun?	
а	. Common	b. Abstract	c. Uncountab	le	d. Proper
18. 7	The English of kepiting	?			
а	. Shark	b. Seal	c. Seagull	d. Crał	0
19. 7	The meaning of Midwife	2?			
а	a. Suster	b. Bidan	c. Pedagang	d. Dos	sen
20. 7	The English of <i>hiu</i> ?				
а	ı. Fish	b. Shark	c. Sea Eagle	d. Seal	l
21. E	Below are some nouns w	hich are includ	ed common no	un, exce	ept?
а	a. City	b. Oppo	c. Watermel	lon	d. Boy
22. T	he English of Apoteker.	?			
а	a. Painter	b. Teacher	c. Pharmacist		d. Officer
23. T	he meaning of soldier	?			
a.	Pelukis	b. tentara	c. Pedagang		d. Supir
24. B	elow are some nouns wl	nich are include	ed proper noun,	except?	2
a.	Beach	b. Oppo	c. Watermelo	n	d. Aisyah
25. 7	The English of Kelinci?				
а	. Rabbit b. Tor	toise	c. Swan	d. Rat	

Instrumen for pre test after validity									
Name : Class : Saying Basmallah before do Choose the most appropria 26. The meaning of <i>Rat</i>	oing the test te answer! (Pi ?	lihlahJawabar	yang paling tepat!)						
b. Tikus	b. Sarang	c. Kuda	d. Singa						
27. Below are included in co	mmon noun, ex	xcept?							
b. Parrot	b. Country	c. Handphone	d. Bag						
28. The English of Supir	?								
b. Driver	b. Teacher	c. Soldier	d. Nurse						
29. Parrot, Eagle, Chicken, I	Dove, and Crow	are included in	n?						
b. Common Noun	b. Abstract N	loun c. Un	countable Noun	d.					
Proper Noun									
30. The meaning of <i>Headma</i>	ster?								
b. Guru	b. Penjaga Se	kolah c. Peg	awai d. Kepala Seko	olah					
31. The Eagle sea is inclu	uded in	?							
b. Common Noun	b. Abstract N	loun c. Un	countable Noun	d.					
Proper Noun									
32. Manager, Actor, and Doc	tor are included	1 in noun.							
a. Common	b. Abstract	c. Uncountab	d. Proper						
33. The meaning of Dentist?									
b. Dokter Gigi	b. Perawat	c. Guru	d. Petani						
34. Manngo, Orange, and A	pple are includ	ed in nou	n.						
a. Common b. Ab	stract c. Un	countable	d. Proper						
35. Below are included in pr	oper noun, exc	ept?							
b. Shark	b. Dolphin	c. Lecturer	d. Frog						
36. Where is proper noun from	om these words	?							

Fish	b. Animal	c. Fruit	d. Tea	cher							
37. The English of <i>paus</i> ?											
Shark	b. Seal	c. Seagull	d. Cral)							
38. Below are some nouns which are included proper noun, except?											
Snake	b. City	c. Fish	d. Eag	le							
39. What is the meaning of Seller?											
Pedagang	b. Pemulung	c. Artis	d. Foto	ografer							
40. Fish is the sea animal, so fish is included in noun?											
Common	b. Abstract	c. Uncountable		d. Proper							
he English of kepiting	?										
Shark	b. Seal	c. Seagull	d. Cral	0							
ne meaning of Midwife	?										
Suster	b. Bidan	c. Pedagang	d. Dos	sen							
elow are some nouns w	hich are include	ed common not	ın, exce	ept?							
City	b. Oppo	c. Watermel	on	d. Boy							
e English of Apoteker.	?										
		c. Pharmacist		1 0 00							
Painter	b. Teacher	c. Pharmacist		d. Officer							
Painter e meaning of soldier	b. Teacher	c. Pharmacist		d. Officer							
	Fish he English of <i>paus</i> Shark elow are some nouns wi Snake That is the meaning of S Pedagang sh is the sea animal, so Common he English of <i>kepiting</i> Shark he meaning of Midwife Suster elow are some nouns wi City e English of Apoteker	Fishb. Animalhe English of paus?Sharkb. Sealelow are some nouns which are includeSnakeb. City'hat is the meaning of Seller?Pedagangb. Pemulungsh is the sea animal, so fish is includedCommonb. Abstracthe English of kepiting?Sharkb. Sealhe meaning of Midwife?Susterb. Bidanelow are some nouns which are includedCityb. Oppoe English of Apoteker?	Fishb. Animalc. Fruithe English of paus?Sharkb. Sealc. Seagullelow are some nouns which are included proper noun.Snakeb. Cityc. FishVhat is the meaning of Seller?Pedagangb. Pemulungc. Artissh is the sea animal, so fish is included innCommonb. Abstractc. Uncountabhe English of kepiting?Sharkb. Sealc. Seagullhe meaning of Midwife?Susterb. Bidanc. Pedagangelow are some nouns which are included common nouCityb. Oppoc. Watermele English of Apoteker?	Fishb. Animalc. Fruitd. Teachhe English of paus?Sharkb. Sealc. Seagulld. Crallelow are some nouns which are included proper noun, exceptsnakeb. Cityc. Fishd. EaglePadagangb. Pemulungc. Artisd. Fotosh is the meaning of Seller?Pedagangb. Pemulungc. Artisd. Fotosh is the sea animal, so fish is included innoun?Commonb. Abstractc. Uncountablehe English of kepiting?Sharkb. Sealc. Seagulld. Crallhe meaning of Midwife?susterb. Bidanc. Pedagangd. Doselow are some nouns which are included common noun, exceedcityb. Oppoc. Watermelone English of Apoteker?sustersustersustersuster							

Instrument for post-test before validity

Saying Basmallah before doing the test

Choose the most appropriate answer! (*Pilihlah Jawaban yang paling tepat*!)

- 1. The word chain of guava in fruit is....?
 - a. Apricot-tamarind-durian-nectarine
 - b. Avocado- olive- elderberry- yogurt
 - c. Apricot- tangerine-eagle-elderberry
 - d. Apple, eat, tamarind, date
- 2. The word chain of bull in animal is....?
 - a. Leopard-dove-eel-leech
 - b. Lion-newt-tear rabbit
 - c. Leech-hunt -newt-tired
 - d. Life- eagle-elk- kiwi
- 3. ant, badger, beagle, bee, are included in?
- a. Pantryb. zooc. animald. food4. The English of *kumbang* is.....?
 - a. Barrel b. beetle c. Kettle d. battle
- 5. The word chain of buffalo in animal is....?
 - a. Oyster- raccoon- newt-tiffani
 - b. Oyster-rabbit-tapir-rabbit
 - c. Otter-tiger-ring-gorilla
 - d. Octopus- scorpion- newt-tetre
- 6. Blackberry, blueberry, date, dragonfruit are included in?
 - a. Animal b. Proffesion c. Fruit d. gedget
- 7. Lizard, duck, kangaroo, otter are included in?
 - a. Material b. Proper c. Common d. Uncountable
- 8. turtule, whale, walrus are included in....?

a.	Common noun	b. proper noun	c. collective noun	d. material
	noun			

- 9. The word chain of "actor" in profession are?
 - a. Reporter-rubber-receptionist-teacher
 - b. Referee-employee-eat-technician
 - c. receptionist-teller-referee-engineer
 - d. receptionist-teller-reporter-reference
- 10. The journalist always wants to know about the new news in each area. The underline word is included in?
 - a. Uncountable noun b. common noun c. proper noun d. countable noun
- 11. Which the word below is included in proper noun.....?
 - a. Bandung b. Boy c. Farmer d. seller
- 12. Host, actrees, cat are included in noun.
 - a. Uncountable b. common c. material d. proper
- 13. The word lawyer is included in?
 - a. proper b. material c. common d. uncountable

14. Below are some nouns that are included in common noun, except ...?

a. farmer b. dentist c. tiger d. singapur

15. Below are some nouns that are included in proper noun, except?

a. ahmad b. fruit c. cat d. lion

16. Midwife is included in common noun; the Meaning of Midwife is...?

- a. Perawat b. Bidan c. Suster d. dokter
- 17. The english of penjahit is ...?
 - a. Sailor b. Tailor c. Referee d. painter
- 18. The word pineapple is included in?a. Properb. materialc. commond.

uncountable

19. The word chain of pear in fruit is?

a.	Rhubarb-banana-avo	ocado-olive										
b.	Rabbit-tangerine-earwig-guava											
c.	Rose-epple-elephant-tamarind											
d.	d. Raspberry-yogurt-tamarind-date											
20. the	e word chain of crab in	n animal is ?										
a.	a. bee-elk-knife											
b.	beetle-ear-raven											
c.	buffalo-own -lamb											
d.	d. bison-newt-tortoise											
21. the	e word singer is inclu	ded in										
a.	material c. co	mmon	c. proper	d. uncountable								
22. The	e word chain of Nurs	e in profession.	?									
c.	Ecologist- technician	-novelist-teller										
d.	Economist-teller-rece	ptionist-tangeri	ine									
e.	Editor-referee-elepha	nt-teacher										
f.	Employee-editor-rat-	trout										
23. Bel	ow are some nouns w	hich are include	ed proper noun, except	?								
b.	River	b. Oppo	c. Watermelon	d. Aisyah								
24. Ma	nager, Actor, and Doc	ctor are included	d in noun.									
a.	Common	b. Abstract	c. Uncountable	d. Proper								
25. Th	e word painter is inclu	uded in ?										
c.	Animal	b. Fruit	c. Food	d. Profession								

Instrument for post test after validity

Name :

Class :

Saying Basmallah before doing the test

Choose the most appropriate answer! (Pilihlah Jawaban yang paling tepat!)

25. The word chain of guava in fruit is....?

- e. Apricot-tamarind-durian-nectarine
- f. Avocado- olive- elderberry- yogurt
- g. Apricot- tangerine-eagle-elderberry
- h. Apple, eat, tamarind, date
- 26. The word chain of bull in animal is....?
 - e. Leopard-dove-eel-leech
 - f. Lion-newt-tear rabbit
 - g. Leech-hunt -newt-tired
 - h. Life- eagle-elk- kiwi
- 27. ant, badger, beagle, bee, are included in?
 - b. Pantry b. zoo c. animal d. food
- 28. The word chain of buffalo in animal is....?
 - e. Oyster- raccoon- newt-tiffani
 - f. Oyster-rabbit-tapir-rabbit
 - g. Otter-tiger-ring-gorilla
 - h. Octopus- scorpion- newt-tetre
- 29. Lizard, duck,kangaroo, otter are included in?
 - b. Material b. Proper c. Common d. Uncountable

30. turtule, whale, walrus are included in....?

- b. Common noun b. proper noun c. collective noun d. material noun
- 31. The word chain of "actor" in profession are?

6	e.	Reporter-rubb	er-receptionis	t-teacher									
1	f.	Referee-emplo	oyee-eat-tech	nician									
ş	g.	receptionist-teller-referee-engineer											
1	h.	receptionist-te	ller-reporter-	reference									
32.7	Гh	e journalist al	ways wants t	o know at	bout 1	the new	w news	in eacl	h area. The				
ı	une	derline word is	included in	?									
1	b .	Uncountable r	noun b. co	mmon nour	n	c. proj	per noun	l	d.				
		countable nou	n										
33. י	Wł	nich the word b	elow is includ	led in prop	er no	un	?						
1	b .	Bandung	b. Boy	c. Farm	ler	d. sel	ler						
34.	Ho	ost, actrees, are	e included in		noun								
1	b .	Uncountable	b. common	с	. ma	terial		d. proj	per				
35.	Гh	e word lawyer	is included in	?	?								
1	b .	proper	b. material	с	. cor	nmon		d. unco	ountable				
36. 1	Be	low are some n	ouns that are	included in	prop	er nou	n, excep	t ?					
1	b.	ahmad	b. fruit	c	. cat		d. lion	l					
37.1	Mi	dwife is includ	led in commo	n noun; the	e Mea	aning o	f Midwi	fe is	?				
1	b .	Perawat	b. Bi	lan		c. Su	ster		d. dokter				
38. 7	Гh	e english of per	njahit is?										
1	b .	Sailor	b. Tailor			c. Re	feree		d. painter				
39.7	Гh	e word host is	included in	?									
1	b .	Proper	b. ma	iterial		c. con	nmon		d.				
		uncountable											
40.7	Гh	e word chain of	f pear in fruit	is?									
(e.	Rhubarb-bana	na-avocado-o	live									
1	f.	Rabbit-tangeri	ine-earwig-gu	ava									
Į	g.	Rose-epple-el	ephant-tamari	nd									
1	h.	Raspberry-yog	gurt-tamarind	-date									
41. t	he	word chain of	crab in anima	ıl is ?									

- e. bee-elk-knife
- f. beetle-ear-raven
- g. buffalo-own -lamb
- h. bison-newt-tortoise

42. the word singer is included in.....

b. material c. common c. proper d. uncountable

- 43. The word chain of Nurse in profession....?
 - g. Ecologist- technician-novelist-teller
 - h. Economist-teller-receptionist-tangerine
 - i. Editor-referee-elephant-teacher
 - j. Employee-editor-rat- trout
- 44. Manager, Actor, and Doctor are included in..... noun.
 - a. Common b. Abstract c. Uncountable d. Proper

Post- test	Pre- test
1. A	1. A
2. A	2. A
3. C	3. A
4. B	4. D
5. B	5. D
6. B	6. D
7. C	7. A
8. B	8. A
9. A	9. D
10. B	10. C
11. C	11. A
12. B	12. B
13. B	13. B
14. B	14. A
15. A	15. D
16. A	16. D
17. D	17. B
18. C	18. C
19. A	19. C
20. A	20. B

Key Answer

8

Validity of Pre Test

	No		Item													
	INO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	1
	1	1	1	1	1	1	0	0	1	0	1	0	1	1	1	
	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	3	0	0	0	0	0	1	0	0	0	1	0	0	0	0	
	4	1	1	1	1	1	1	0	1	0	1	1	1	1	1	
	5	1	1	1	1	0	1	1	1	1	1	1	1	1	1	
	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	8	0	0	1	1	1	1	1	0	1	1	1	1	0	0	
	9	1	1	0	1	0	1	0	1	0	1	1	1	1	1	
H	10	1	1	1	0	1	1	1	1	1	1	1	0	1	1	
lesi	11	1	1	1	1	1	1	1	1	1	1	1	1	0	1	
on	12	1	1	1	1	0	1	0	1	0	1	1	1	1	1	
den	13	1	1	1	1	0	1	0	1	0	1	1	1	1	1	
ŧ.	14	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	15	0	0	0	0	0	0	0	0	0	0	1	0	1	0	
	16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	17	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	18	1	1	1	0	1	1	1	1	1	1	1	0	1	1	
	19	1	1	1	1	1	0	1	1	1	0	1	1	0	1	
	20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	21	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	22	1	1	1	1	1	1	1	1	1	1	0	1	1	1	
	23	1	1	1	1	0	1	0	1	0	1	0	1	1	1	
	24	1	1	1	1	1	1	1	1	1	1	1	1	0	1	
	25	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	N=25	22	22	22	21	18	22	17	22	17	23	21	21	20	22	1
	р	0,9	0,9	0,9	0,8	0,7	0,9	0,7	0,9	0,7	0,9	0,8	0,8	0,8	0,9	0
	q	0,1	0,1	0,1	0,2	0,3	0,1	0,3	0,1	0,3	0,1	0,2	0,2	0,2	0,1	C
	r															
	tabel	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	(
	r hitung	0 76	0 76	0 0	0 5 1	0 67	0 5 1	0.75	0 76	0.75	0 5 2	0 22	0 5 1	0.22	0 76	0
	intung	0,70	0,70	0,8	0,51	0,07	0,51	0,75	0,70	0,75	0,52	0,33	0,51	0,22	0,70	U,

Calculation of Pre-Test

1. Mean score from score total (M_t)

$$M_t = \frac{\sum X_t}{N}$$
$$M_t = \frac{510}{25} = 20.4$$

2. Standard Deviation (SD_t)

$$SD_{t} = \sqrt{\frac{\Sigma X_{t^{2}}}{N} - \left(\frac{\Sigma X_{t}}{N}\right)^{2}}$$

$$SD_{t} = \sqrt{\frac{11264}{25} - \left(\frac{510}{25}\right)^{2}}$$

$$SD_{t} = \sqrt{450.56 - 20.4^{2}}$$

$$SD_{t} = \sqrt{450.56 - 416.16}$$

$$SD_{t} = \sqrt{34.4} = 6$$

3. Mean Score (M_p)

Item 1

$$M_{pl} = \frac{totalscore of students's core that true itemans wer}{n1}$$

$$M_{pl} = \frac{17+25+19+23+25+25+15+23+24+18+18+25+25+25+23+18+22+25+24+17+24+25}{22}$$

$$M_{pl} = \frac{485}{22} = 22.04$$

Item 2

$$\begin{split} M_{pl} = & \frac{totalscore of students's core that true item answer}{n2} \\ M_{pl} = & \frac{17+25+19+23+25+25+15+23+24+18+18+25+25+25+23+18+22+25+24+17+24+25}{22} \\ M_{pl} = & \frac{485}{22} = 22.04 \end{split}$$

Item 3

$$M_{pl} = \frac{totalscore of students' score that true itemans wer}{n_{pl}}$$

$$M_{pl} = \frac{17+25+19+23+25+25+17+23+24+18+18+25+25+25+23+18+22+25+24+17+24+25}{22}$$

$$M_{pl} = \frac{487}{22} = 22.13$$

Item 4

$$\begin{split} & M_{pl} = \frac{totalscore of students's core that true itemans wer}{M_{pl} = \frac{17+25+19+23+25+25+17+15+24+18+18+25+25+25+18+22+25+24+17+24+25}{21}} \\ & M_{pl} = \frac{456}{21} = 21.71 \end{split}$$
$$\begin{split} M_{pl} = & \frac{totalscore of students's core that true itemans wer}{n5} \\ M_{pl} = & \frac{17+25+19+25+25+17+23+24+25+25+25+23+18+22+25+24+24+25}{18} \\ M_{pl} = & \frac{411}{18} = 22.83 \end{split}$$

Item 6

$$M_{pl} = \frac{totalscore of students's core that true itemans wer}{M_{pl} = \frac{25+6+19+23+25+25+17+15+23+24+18+18+25+25+25+23+22+25+24+17+24+25}{22}}$$

$$M_{pl} = \frac{473}{22} = 21.5$$

Item 7

$$M_{pl} = \frac{totalscore of students's core that true itemans wer}{n7}$$

$$M_{pl} = \frac{25 + 23 + 25 + 25 + 17 + 23 + 24 + 25 + 25 + 25 + 23 + 18 + 22 + 25 + 24 + 24 + 25}{17}$$

$$M_{pl} = \frac{398}{17} = 23.41$$

Item 8

$$\begin{split} M_{pl} &= \frac{totalscore of students's core that true itemans wer}{n8} \\ M_{pl} &= \frac{17+25+19+23+25+25+15+23+24+18+18+25+25+25+23+18+22+25+24+17+24+25}{22} \\ M_{pl} &= \frac{485}{22} = 22.04 \end{split}$$

Item 9

$$M_{pl} = \frac{totalscore of students's core that true itemans wer}{n9}$$

$$M_{pl} = \frac{25 + 23 + 25 + 25 + 17 + 23 + 24 + 25 + 25 + 25 + 23 + 18 + 22 + 25 + 24 + 24 + 25}{17}$$

$$M_{pl} = \frac{398}{17} = 23.41$$

Item 10

$$\begin{split} M_{pl} &= \frac{totalscore of students's core that true item answer}{n10} \\ M_{pl} &= \frac{M_{pl}}{17+25+6+19+23+25+25+17+15+23+24+18+18+25+25+23+22+25+24+17+24+25}{23} \\ M_{pl} &= \frac{490}{23} = 21.30 \end{split}$$

$$\begin{split} M_{pl} &= \frac{totalscore of students's core that true itemans wer}{n11} \\ M_{pl} &= \frac{25 + 19 + 23 + 25 + 25 + 17 + 15 + 23 + 24 + 18 + 18 + 25 + 2 + 25 + 25 + 23 + 18 + 22 + 25 + 24 + 25}{21} \\ M_{pl} &= \frac{446}{21} = 21.23 \end{split}$$

$$\begin{array}{l} \textbf{Item 12} \\ M_{pl} = & \underbrace{ \textit{totalscoreofstudents'scorethattrueitemanswer} } \\ M_{pl} = & \underbrace{ \frac{17+25+19+23+25+25+17+15+24+18+18+25+25+25+18+22+25+24+17+24+25}{21} \\ M_{pl} = & \underbrace{ \frac{456}{21} = 21.71 } \end{array}$$

$$\begin{split} M_{pl} &= \frac{totalscore of students's core that true itemans wer}{n13} \\ M_{pl} &= \frac{17+25+19+23+25+25+15+23+18+18+25+2+25+25+23+22+25+24+17+25}{20} \\ M_{pl} &= \frac{421}{20} = 21.05 \end{split}$$

Item 14

$$\begin{split} M_{pl} &= \frac{totalscore of students's core that true itemans wer}{n14} \\ M_{pl} &= \frac{17+25+19+23+25+25+15+23+24+18+18+25+25+25+23+18+22+25+24+17+24+25}{22} \\ M_{pl} &= \frac{485}{22} = 22.04 \end{split}$$

Item 15

$$\begin{split} M_{pl} &= \frac{totalscore of students's core that true itemans wer}{n15} \\ M_{pl} &= \frac{25 + 23 + 25 + 25 + 17 + 23 + 24 + 25 + 25 + 25 + 23 + 18 + 22 + 25 + 24 + 24 + 25}{17} \\ M_{pl} &= \frac{398}{17} = 23.41 \end{split}$$

Item 16

 $M_{pl} = \frac{totalscore of students's core that true item answer}{n16}$ $M_{pl} = \frac{25+23+25+25+17+23+24+25+25+25+23+18+22+25+24+24+25}{17}$ $M_{pl} = \frac{398}{17} = 23.41$

$$\begin{split} M_{pl} &= \frac{totalscore of students's core that true itemans wer}{n17} \\ M_{pl} &= \frac{17+25+23+25+25+15+23+24+18+18+25+25+25+23+18+22+25+24+17+24+25}{21} \\ M_{pl} &= \frac{466}{21} = 22.19 \end{split}$$

$$M_{pl} = \frac{totalscore of students's core that true itemans wer}{n18}$$

$$M_{pl} = \frac{17+25+6+19+23+25+25+17+15+23+24+18+18+25+25+25+23+25+24+17+24+25}{22}$$

$$M_{pl} = \frac{468}{22} = 21.27$$

Item 19

$$M_{pl} = \frac{totalscore of students's core that true itemans wer}{n19}$$

$$M_{pl} = \frac{17+25+19+25+25+17+23+24+25+25+25+23+18+22+25+24+24+25}{18}$$

$$M_{pl} = \frac{411}{18} = 22.83$$

Item 20

$$\begin{split} M_{pl} &= \frac{totalscore of students's core that true itemans wer}{n20} \\ M_{pl} &= \frac{17+25+6+19+23+25+25+17+23+24+18+18+25+25+25+23+25+24+17+24+25}{21} \\ M_{pl} &= \frac{453}{21} = 21.57 \end{split}$$

Item 21

$$M_{pl} = \frac{totalscore of students' score that true itemans wer}{n21}$$

$$M_{pl} = \frac{25+23+25+25+17+23+24+25+25+25+23+18+22+25+24+24+25}{17}$$

$$M_{pl} = \frac{398}{17} = 23.41$$

Item 22

$$\begin{split} M_{pl} &= \frac{totalscore of students's core that true itemans wer}{n22} \\ M_{pl} &= \frac{25+6+19+23+25+25+17+15+23+24+18+18+25+25+25+23+22+25+24+17+24+25}{22} \\ M_{pl} &= \frac{473}{22} = 21.5 \end{split}$$

$$M_{pl} = \frac{totalscore of students's core that true itemans wer}{n23}$$

$$M_{pl} = \frac{17+25+19+23+25+25+15+23+24+18+18+25+25+25+23+18+22+25+24+17+24+25}{22}$$

$$M_{\rm pl} = \frac{485}{22} = 22.04$$

$$M_{pl} = \frac{totalscore of students's core that true itemans wer}{n24}$$

$$M_{pl} = \frac{17+25+19+23+25+25+15+23+24+18+18+25+25+25+23+18+22+25+24+17+24+25}{22}$$

$$M_{pl} = \frac{485}{22} = 22.04$$

Item 25

$$M_{pl} = \frac{totalscoreof students's core that true itemans wer}{n25}$$

$$M_{pl} = \frac{17+25+6+19+23+25+25+17+23+24+18+18+25+25+23+25+24+17+24+25}{21}$$

$$M_{pl} = \frac{453}{21} = 21.57$$

Calculation of Post-Test

4. Mean score from score total (M_t)

$$M_{t} = \frac{\sum X_{t}}{N}$$
$$M_{t} = \frac{\frac{415}{25}}{25} = 16.6$$

5. Standard Deviation (SD_t)

$$SD_{t} = \sqrt{\frac{\Sigma X_{t^{2}}}{N} - \left(\frac{\Sigma X_{t}}{N}\right)^{2}}$$

$$SD_{t} = \sqrt{\frac{7797}{25} - \left(\frac{415}{25}\right)^{2}}$$

$$SD_{t} = \sqrt{311.88 - 16.6^{2}}$$

$$SD_{t} = \sqrt{311.88 - 275.56}$$

$$SD_{t} = \sqrt{36.32} = 6$$

6. Mean Score (M_p)

Item 1

$$M_{pl} = \frac{totalscore of students's core that true itemans wer}{n1}$$

$$M_{pl} = \frac{13+10+17+16+23+24+19+19+25+20+15+12+13+18+20+24+23+12+24+18}{20}$$

$$M_{pl} = \frac{365}{20} = 18.25$$

$$\begin{split} M_{pl} = & \frac{totalscore of students's core that true itemans wer}{n2} \\ M_{pl} = & \frac{19+15+16+23+24+19+19+25+15+18+24+23+24+18}{14} \\ M_{pl} = & \frac{282}{14} = 20.14 \end{split}$$

$$\begin{split} M_{pl} = & \frac{totalscore of students's core that true itemans wer}{n_{pl}} \\ M_{pl} = & \frac{13+10+17+16+23+24+19+19+25+20+15+12+13+18+20+24+23+12+24+18}{20} \\ M_{pl} = & \frac{365}{20} = 18.25 \end{split}$$

Item 4

$$M_{pl} = \frac{totalscore of students's core that true itemans wer}{n4}$$

$$M_{pl} = \frac{19+13+10+15+17+16+23+24+19+2+25+3+20+15+12+13+18+20+24+23+24+18}{22}$$

$$M_{pl} = \frac{375}{22} = 16.95$$

Item 5

$$\begin{split} M_{pl} &= \frac{totalscore of students \ score that true item answer}{n5} \\ M_{pl} &= \frac{19+15+17+16+23+24+11+19+19+25+20+15+12+18+20+24+23+24+18}{19} \\ M_{pl} &= \frac{362}{19} = 19.05 \\ \textbf{Item 6} \\ M_{pl} &= \frac{totalscore of students \ score that true item answer}{n6} \\ M_{pl} &= \frac{19+13+10+15+17+16+23+24+19+2+25+3+20+15+12+13+20+24+23+24+18}{21} \\ M_{pl} &= \frac{355}{21} = 16.90 \end{split}$$

Item 7

$$M_{pl} = \frac{totalscore of students's core that true itemans wer}{n7}$$

$$M_{pl} = \frac{19+13+10+15+17+23+24+11+19+25+20+15+13+18+20+24+23+12+24}{19}$$

$$M_{pl} = \frac{345}{19} = 18.15$$

$$M_{pl} = \frac{totalscore of students's core that true itemans wer}{n8} M_{pl} = \frac{19+15+17+23+24+11+19+25+20+13+20+24+23+12+24+18}{16}$$

$$M_{\rm pl} = \frac{307}{16} = 19.18$$

$$\begin{split} M_{pl} &= \frac{totalscore of students's core that true itemans wer}{n9} \\ M_{pl} &= \frac{19 + 13 + 10 + 23 + 24 + 11 + 19 + 25 + 20 + 18 + 20 + 24 + 23 + 12 + 24}{15} \\ M_{pl} &= \frac{285}{15} = 19 \end{split}$$

Item 10

$$\begin{split} M_{pl} &= \frac{totalscore of students's core that true item answer}{n10} \\ M_{pl} &= \frac{19+15+17+16+23+24+11+19+19+25+20+15+12+18+20+24+23+24+18}{19} \\ M_{pl} &= \frac{362}{19} = 19.05 \end{split}$$

Item 11

$$\begin{split} M_{pl} &= \frac{totalscore of students's core that true itemans wer}{n11} \\ M_{pl} &= \frac{19+15+17+16+23+24+11+19+19+25+20+15+12+18+20+24+23+24+18}{19} \\ M_{pl} &= \frac{362}{19} = 19.05 \end{split}$$

Item 12

$$\begin{split} M_{pl} &= \frac{totalscore of students score that true itemans wer}{n12} \\ M_{pl} &= \frac{19+13+10+23+24+11+19+25+20+18+20+24+23+12+24}{15} \\ M_{pl} &= \frac{285}{15} = 19 \end{split}$$

Item 13

$$M_{pl} = \frac{totalscore of students' score that true itemans wer}{n13}$$

$$M_{pl} = \frac{13+10+17+16+23+24+19+19+25+20+15+12+13+18+20+24+23+12+24+18}{20}$$

$$M_{pl} = \frac{365}{20} = 18.25$$

Item 14

 $M_{pl} = \frac{totalscore of students' score that true itemans wer}{19+15+16+11+19+25+20+12+18+24+23+24}$ $M_{pl} = \frac{19+15+16+11+19+25+20+12+18+24+23+24}{12}$ $M_{pl} = \frac{226}{12} = 18.83$

 $M_{pl} = \frac{\textit{totalscore} of \textit{students}' \textit{score} \textit{thattrue} \textit{itemanswer}}{}$ $M_{pl} = \frac{n15}{16}$ $M_{pl} = \frac{19+15+17+23+24+11+19+25+20+13+20+24+23+12+24+18}{16}$ $M_{\rm pl} = \frac{307}{16} = 19.18$

Item 16

$$M_{pl} = \frac{totalscore of students's core that true itemans wer}{n16}$$

$$M_{pl} = \frac{13+10+17+16+23+24+19+19+25+20+15+13+20+24+23+24}{16}$$

$$M_{pl} = \frac{305}{16} = 19.06$$

Item 17

$$\begin{split} M_{pl} &= \frac{\textit{totalscore of students score that true itemans wer}}{n17} \\ M_{pl} &= \frac{19+15+17+23+24+11+19+25+20+13+20+24+23+12+24+18}{16} \\ M_{pl} &= \frac{307}{16} = 19.18 \end{split}$$

Item 18

 $M_{pl} = \frac{totalscore of students' score that true itemans wer}{n18} M_{pl} = \frac{19+13+17+23+24+19+25+20+12+18+20+24+24}{13}$ $M_{\rm pl} = \frac{258}{13} = 19.84$

,

Item 19

$$M_{pl} = \frac{totalscore of students' score that true itemans wer}{n19}$$

$$M_{pl} = \frac{19+15+16+23+24+19+19+25+15+18+24+23+24+18}{14}$$

$$M_{pl} = \frac{282}{14} = 20.14$$

$$\begin{split} M_{pl} &= \frac{totalscore of students's core that true itemans wer}{n20} \\ M_{pl} &= \frac{19+15+16+23+24+19+19+25+15+18+24+23+24+18}{14} \\ M_{pl} &= \frac{282}{14} = 20.14 \\ \textbf{Item 21} \\ M_{pl} &= \frac{totalscore of students's core that true itemans wer}{n21} \\ M_{pl} &= \frac{19+15+16+23+24+19+19+25+15+18+24+23+24+18}{14} \end{split}$$

$$M_{\rm pl} = \frac{282}{14} = 20.14$$

$$\begin{split} M_{pl} &= \frac{totalscore of students's core that true itemans wer}{n22} \\ M_{pl} &= \frac{19+15+17+23+24+11+19+25+20+13+20+24+23+12+24+18}{16} \\ M_{pl} &= \frac{307}{16} = 19.18 \end{split}$$

Item 23

$$\begin{split} M_{pl} &= \frac{totalscore of students' score that true itemans wer}{n23} \\ M_{pl} &= \frac{13 + 16 + 24 + 19 + 19 + 25 + 3 + 13 + 20 + 23 + 12 + 18}{12} \\ M_{pl} &= \frac{205}{12} = 17.08 \end{split}$$

$$\begin{split} & \textbf{Item 24} \\ & M_{pl} = \frac{\textit{totalscoreofstudents'scorethattrueitemanswer}}{19+13+17+23+24+19+25+20+12+18+20+24+24}} \\ & M_{pl} = \frac{19+13+17+23+24+19+25+20+12+18+20+24+24}{13} \\ & M_{pl} = \frac{258}{13} = 19.84 \end{split}$$

Item 25

$$\begin{split} M_{pl} &= \frac{totalscore of students's core that true itemans wer}{n25} \\ M_{pl} &= \frac{13 + 10 + 17 + 16 + 23 + 24 + 19 + 19 + 25 + 20 + 15 + 12 + 13 + 18 + 20 + 24 + 23 + 12 + 24 + 18}{20} \\ M_{pl} &= \frac{365}{20} = 18.25 \end{split}$$

Appendix 9

Table Validity of Pre-test

No	M _p	M _t	SDt	Р	Q	$r_{pbi=\frac{M_{p-M_t}}{SD_t}}\sqrt{\frac{p}{q}}$	r _t on 5% significant	Interpretation
1.	22.04	20.4	6	0.9	0.1	0.81	0.396	valid
2.	22.04	20.4	6	0.9	0.1	0.81	0.396	valid

3.	22.13	20.4	6	0.9	0.1	0.84	0.396	valid
4.	21.71	20.4	6	0.8	0.2	0.42	0.396	valid
5.	22.83	20.4	6	0.7	0.3	0.61	0.396	valid
6.	21.5	20.4	6	0.9	0.1	0.54	0.396	valid
7.	23.41	20.4	6	0.7	0.3	0.76	0.396	valid
8.	22.04	20.4	6	0.9	0.1	0.81	0.396	valid
9.	23.41	20.4	6	0.7	0.3	0.76	0.396	valid
10.	21.30	20.4	6	0.9	0.1	0.45	0.396	valid
11.	21.23	20.4	6	0.8	0.2	0.26	0.396	invalid
12.	21.71	20.4	6	0.8	0.2	0.42	0.396	valid
13.	21.05	20.4	6	0.8	0.2	0.21	0.396	invalid
14.	22.04	20.4	6	0.9	0.1	0.81	0.396	valid
15.	23.41	20.4	6	0.7	0.3	0.76	0.396	valid
16.	23.41	20.4	6	0.7	0.3	0.76	0.396	valid
17.	22.19	20.4	6	0.8	0.2	0.58	0.396	valid
18.	21.27	20.4	6	0.9	0.1	0.43	0.396	valid
19.	22.83	20.4	6	0.7	0.3	0.61	0.396	valid
20.	21.57	20.4	6	0.8	0.2	0.39	0.396	invalid
21.	23.41	20.4	6	0.7	0.3	0.76	0.396	valid
22.	21.5	20.4	6	0.9	0.1	0.54	0.396	valid
23.	22.04	20.4	6	0.9	0.1	0.81	0.396	valid
24.	22.04	20.4	6	0.9	0.1	0.81	0.396	valid
25.	21.57	20.4	6	0.8	0.2	031	0.396	invalid

Appendix 10

Realibi

I	No												
les	INO.	1	2	3	4	5	6	7	8	9	10	11	12
noç	1	1	1	1	1	1	0	0	1	0	1	0	1
den	2	1	1	1	1	1	1	1	1	1	1	1	1
It	3	0	0	0	0	0	1	0	0	0	1	0	0

	-	-	-	-		-			-		-	-	
	4	1	1	1	1	1	1	0	1	0	1	1	1
	5	1	1	1	1	0	1	1	1	1	1	1	1
	6	1	1	1	1	1	1	1	1	1	1	1	1
	7	1	1	1	1	1	1	1	1	1	1	1	1
	8	0	0	1	1	1	1	1	0	1	1	1	1
	9	1	1	0	1	0	1	0	1	0	1	1	1
	10	1	1	1	0	1	1	1	1	1	1	1	0
	11	1	1	1	1	1	1	1	1	1	1	1	1
	12	1	1	1	1	0	1	0	1	0	1	1	1
	13	1	1	1	1	0	1	0	1	0	1	1	1
	14	1	1	1	1	1	1	1	1	1	1	1	1
	15	0	0	0	0	0	0	0	0	0	0	1	0
	16	1	1	1	1	1	1	1	1	1	1	1	1
	17	1	1	1	1	1	1	1	1	1	1	1	1
	18	1	1	1	0	1	1	1	1	1	1	1	0
	19	1	1	1	1	1	0	1	1	1	0	1	1
	20	1	1	1	1	1	1	1	1	1	1	1	1
	21	1	1	1	1	1	1	1	1	1	1	1	1
	22	1	1	1	1	1	1	1	1	1	1	0	1
	23	1	1	1	1	0	1	0	1	0	1	0	1
	24	1	1	1	1	1	1	1	1	1	1	1	1
	25	1	1	1	1	1	1	1	1	1	1	1	1
	N=25	22	22	22	21	18	22	17	22	17	23	21	21
	р	0,9	0,9	0,9	0,8	0,7	0,9	0,7	0,9	0,7	0,9	0,8	0,8
	q	0,1	0,1	0,1	0,2	0,3	0,1	0,3	0,1	0,3	0,1	0,2	0,2
ł	pq	0,106	0,106	0,106	0,134	0,202	0,106	0,218	0,106	0,218	0,074	0,134	0,134

Appendix 11

Reliability of Pre Test

To get reliability of the test, the researcher uses formula KR-20:

$$\mathbf{R}_{11} = \left(\frac{n}{n-1}\right) \left(\frac{S_{t^2} - \sum pq}{S_{t^2}}\right)$$

$$N=25$$

$$\sum Xt = 510$$

$$\sum Xt^{2} = 11264$$

$$\sum pq = 3.312$$

$$S_{t}^{2} = \sum Xt^{2} - \left(\frac{\sum xt}{N}\right)^{2}$$

$$= 11264 - \left(\frac{510}{25}\right)^{2} = 11264 - 20.4^{2} = 11264 - 416.16 = 10847.84$$

$$S_{t}^{2} = \frac{\sum Xt2}{N} = \frac{10847.84}{25}$$

$$S_{t}^{2} = 433.91$$

$$R_{11} = \left(\frac{n}{n-1}\right) \left(\frac{S_{t2} - \sum pq}{S_{t2}}\right)$$

$$R_{11} = \left(\frac{25}{25 - 1}\right) \left(\frac{433.91 - 3.312}{433.91}\right) = \left(\frac{25}{24}\right) \left(\frac{2878.09}{433.91}\right)$$

$$= (1.04) (6.63)$$

 $= 6.89 (r_{11} > 0.70 = reliable)$

Appendix 12

Reg	No													Item	
spoi	INO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
nde	1	0	1	0	1	1	1	1	1	1	1	1	1	0	1

2	1	0	1	1	0	1	1	0	1	0	0	1	1	0
3	1	0	1	1	0	1	1	0	1	0	0	1	1	0
4	0	1	0	1	1	1	1	1	0	1	1	0	0	1
5	1	0	1	1	1	1	1	1	0	1	1	0	1	0
6	1	1	1	1	1	1	0	0	0	1	1	0	1	1
7	1	1	1	1	1	1	1	1	1	1	1	1	1	0
8	1	1	1	1	1	1	1	1	1	1	1	1	1	0
9	0	0	0	0	1	0	1	1	1	1	1	1	0	1
10	1	1	1	1	1	1	0	0	1	1	1	1	1	0
11	0	0	0	1	0	1	0	0	0	0	0	0	0	0
12	1	1	1	0	1	0	1	1	0	1	1	0	1	1
13	1	1	1	1	1	1	1	1	1	1	1	1	1	1
14	0	0	0	1	0	1	0	0	0	0	0	0	0	0
15	1	0	1	1	1	1	1	1	1	1	1	1	1	1
16	1	1	1	1	1	1	1	0	0	1	1	0	1	0
17	1	0	1	1	1	1	0	0	0	1	1	0	1	1
18	1	0	1	1	0	1	1	1	0	0	0	0	1	0
19	1	1	1	1	1	0	1	0	1	1	1	1	1	1
20	1	0	1	1	1	1	1	1	1	1	1	1	1	0
21	1	1	1	1	1	1	1	1	1	1	1	1	1	1
22	1	1	1	1	1	1	1	1	1	1	1	1	1	1
23	1	0	1	0	0	0	1	1	1	0	0	1	1	0
24	1	1	1	1	1	1	1	1	1	1	1	1	1	1
 25	1	1	1	1	1	1	0	1	0	1	1	0	1	0
 N=25	20	14	20	22	19	21	19	16	15	19	19	15	20	12
р	0,8	0,6	0,8	0,9	0,8	0,8	0,8	0,6	0,6	0,8	0,8	0,6	0,8	0,5
q	0,2	0,4	0,2	0,1	0,2	0,2	0,2	0,4	0,4	0,2	0,2	0,4	0,2	0,5
r														
table	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4
r hituna		0 66		0 1 6	0 72	0 1 2	0 46		0.40	0 72	0 72	0 40		0.26
mung	0,55	0,00	0,55	0,10	0,72	0,12	0,40	0,57	0,49	0,72	0,72	0,49	0,55	0,50

Calculation of the formulation $\mathbf{r}_{\text{pbi}} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$

Item 1

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{22.04 - 20.4}{6} \sqrt{\frac{0.9}{0.1}}$$

$$r_{pbi} = \frac{1.64}{6} \sqrt{9}$$

$$r_{pbi} = 0.27 \times 3 = 0.81$$

Item 2

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{22.04 - 20.4}{6} \sqrt{\frac{0.9}{0.1}}$$

$$r_{pbi} = \frac{1.64}{6} \sqrt{9}$$

$$r_{pbi} = 0.27 \times 3 = 0.81$$

Item 3

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{22.13 - 20.4}{6} \sqrt{\frac{0.9}{0.1}}$$

$$r_{pbi} = \frac{1.73}{6} \sqrt{9}$$

$$r_{pbi} = 0.28 \times 3 = 0.84$$

Item 4

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{21.71 - 20.4}{6} \sqrt{\frac{0.8}{0.2}}$$

$$r_{pbi} = \frac{1.31}{6} \sqrt{4}$$

$$r_{pbi} = 0.21 \text{ x } 2 = 0.42$$

$$\mathbf{r}_{\rm pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{22.83 - 20.4}{6} \sqrt{\frac{0.7}{0.3}}$$

$$r_{pbi} = \frac{2.43}{6} \sqrt{2.33}$$

$$r_{pbi} = 0.405 \text{ x } 1.52 = 0.61$$

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{21.5 - 20.4}{6} \sqrt{\frac{0.9}{0.1}}$$

$$r_{pbi} = \frac{1.1}{6} \sqrt{9}$$

$$r_{pbi} = 0.18 \times 3 = 0.54$$

Item 7

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{23.41 - 20.4}{6} \sqrt{\frac{0.7}{0.3}}$$

$$r_{pbi} = \frac{3.01}{6} \sqrt{2.33}$$

$$r_{pbi} = 0.50 \text{ x } 1.52 = 0.76$$

Item 8

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{22.04 - 20.4}{6} \sqrt{\frac{0.9}{0.1}}$$

$$r_{pbi} = \frac{1.64}{6} \sqrt{9}$$

$$r_{pbi} = 0.27 \times 3 = 0.81$$

$$r_{\rm pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$
$$r_{\rm pbi} = \frac{23.41 - 20.4}{6} \sqrt{\frac{0.7}{0.3}}$$

$$\begin{aligned} r_{pbi} &= \frac{3.01}{6} \sqrt{2.33} \\ r_{pbi} &= 0.50 \text{ x } 1.52 = 0.76 \end{aligned}$$

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{21.30 - 20.4}{6} \sqrt{\frac{0.9}{0.1}}$$

$$r_{pbi} = \frac{0.9}{6} \sqrt{9}$$

$$r_{pbi} = 0.15 \text{ x } 3 = 0.45$$

Item 11

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{21.23 - 20.4}{6} \sqrt{\frac{0.8}{0.2}}$$

$$r_{pbi} = \frac{0.83}{6} \sqrt{4}$$

$$r_{pbi} = 0.13 \text{ x } 2 = 0.26$$

Item 12

$$r_{pbi} = \frac{\frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}}{r_{pbi}}$$
$$r_{pbi} = \frac{\frac{21.71 - 20.4}{7} \sqrt{\frac{0.8}{0.2}}}{r_{pbi}}$$
$$r_{pbi} = \frac{1.31}{6} \sqrt{4}$$
$$r_{pbi} = 0.21 \text{ x } 2 = 0.42$$

Item 13

$$r_{pbi} = \frac{\frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}}{r_{pbi}}$$
$$r_{pbi} = \frac{21.05 - 20.4}{6} \sqrt{\frac{0.8}{0.2}}$$
$$r_{pbi} = \frac{0.65}{6} \sqrt{4}$$
$$r_{pbi} = 0.108 \text{ x } 2 = 0.21$$

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{22.04 - 20.4}{6} \sqrt{\frac{0.9}{0.1}}$$

$$r_{pbi} = \frac{1.64}{6} \sqrt{9}$$

$$r_{pbi} = 0.27 \text{ x } 3 = 0.81$$

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{23.41 - 20.4}{6} \sqrt{\frac{0.7}{0.3}}$$

$$r_{pbi} = \frac{3.01}{6} \sqrt{2.33}$$

$$r_{pbi} = 0.50 \times 1.52 = 0.76$$

Item 16

$$r_{pbi} = \frac{\frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}}{r_{pbi}}$$

$$r_{pbi} = \frac{\frac{23.41 - 20.4}{6} \sqrt{\frac{0.7}{0.3}}}{r_{pbi}}$$

$$r_{pbi} = \frac{3.01}{6} \sqrt{2.33}$$

$$r_{pbi} = 0.50 \times 1.52 = 0.76$$

Item 17

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{22.19 - 20.4}{6} \sqrt{\frac{0.8}{0.2}}$$

$$r_{pbi} = \frac{1.79}{6} \sqrt{4}$$

$$r_{pbi} = 0.29 \text{ x } 2 = 0.58$$

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{21.27 - 20.4}{6} \sqrt{\frac{0.9}{0.1}}$$

$$r_{pbi} = \frac{0.87}{6} \sqrt{9}$$

$$r_{pbi} = 0.145 \text{ x } 3 = 0.43$$

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{22.83 - 20.4}{6} \sqrt{\frac{0.7}{0.3}}$$

$$r_{pbi} = \frac{2.43}{6} \sqrt{2.33}$$

$$r_{pbi} = 0.405 \text{ x } 1.52 = 0.61$$

Item 20

$$r_{pbi} = \frac{\frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}}{r_{pbi}}$$
$$r_{pbi} = \frac{21.57 - 20.4}{6} \sqrt{\frac{0.8}{0.2}}$$
$$r_{pbi} = \frac{1.17}{6} \sqrt{4}$$
$$r_{pbi} = 0.195 \text{ x } 2 = 0.39$$

Item 21

$$r_{pbi} = \frac{\frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}}{r_{pbi}}$$

$$r_{pbi} = \frac{\frac{23.41 - 20.4}{6} \sqrt{\frac{0.7}{0.3}}}{r_{pbi}}$$

$$r_{pbi} = \frac{3.01}{6} \sqrt{2.33}$$

$$r_{pbi} = 0.50 \times 1.52 = 0.76$$

Item 22

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$
$$r_{pbi} = \frac{21.5 - 20.4}{6} \sqrt{\frac{0.9}{0.1}}$$
$$r_{pbi} = \frac{1.1}{6} \sqrt{9}$$
$$r_{pbi} = 0.18 \times 3 = 0.54$$

$$r_{\rm pbi} = \frac{\frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}}{r_{\rm pbi}}$$
$$r_{\rm pbi} = \frac{22.04 - 20.4}{6} \sqrt{\frac{0.9}{0.1}}$$

 $r_{pbi} = \frac{1.64}{6}\sqrt{9}$ $r_{pbi} = 0.27 \text{ x } 3 = 0.81$

Item 24

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{22.04 - 20.4}{6} \sqrt{\frac{0.9}{0.1}}$$

$$r_{pbi} = \frac{1.64}{6} \sqrt{9}$$

$$r_{pbi} = 0.27 \text{ x } 3 = 0.81$$

Item 25 M_{n-M+} \sqrt{n}

$$r_{pbi} = \frac{\frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}}{r_{pbi}}$$
$$r_{pbi} = \frac{21.57 - 20.4}{6} \sqrt{\frac{0.8}{0.2}}$$
$$r_{pbi} = \frac{1.17}{6} \sqrt{4}$$
$$r_{pbi} = 0.159 \text{ x } 2 = 0.31$$

Calculation of the formulation $\mathbf{r}_{\text{pbi}} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$

Item 1

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{18.25 - 16.6}{6} \sqrt{\frac{0.8}{0.2}}$$

$$r_{pbi} = \frac{1.65}{6} \sqrt{4}$$

$$r_{pbi} = 0.275 \text{ x } 2 = 0.55$$

$$r_{\rm pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$
$$r_{\rm pbi} = \frac{20.14 - 16.6}{6} \sqrt{\frac{0.6}{0.4}}$$

$$\begin{split} r_{pbi} &= \frac{3.54}{6} \sqrt{1.5} \\ r_{pbi} &= 0.59 \ x \ 1.22 = 0.71 \end{split}$$

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{18.25 - 16.6}{6} \sqrt{\frac{0.8}{0.2}}$$

$$r_{pbi} = \frac{1.65}{6} \sqrt{4}$$

$$r_{pbi} = 0.275 \text{ x } 2 = 0.55$$

Item 4

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{16.95 - 16.6}{6} \sqrt{\frac{0.9}{0.1}}$$

$$r_{pbi} = \frac{0.35}{6} \sqrt{9}$$

$$r_{pbi} = 0.058 \text{ x } 3 = 0.17$$

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{19.05 - 16.6}{6} \sqrt{\frac{0.8}{0.2}}$$

$$r_{pbi} = \frac{2.45}{6} \sqrt{4}$$

$$r_{pbi} = 0.40 \text{ x } 2 = 0.8$$

Item 6

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{16.90 - 16.6}{6} \sqrt{\frac{0.8}{0.2}}$$

$$r_{pbi} = \frac{0.3}{6} \sqrt{4}$$

 $r_{pbi} = 0.05 \ x \ 2 = 0.1$

Item 7

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{18.15 - 16.6}{6} \sqrt{\frac{0.8}{0.2}}$$

$$r_{pbi} = \frac{1.55}{6} \sqrt{4}$$

$$r_{pbi} = 0.25 \text{ x } 2 = 0.5$$

Item 8

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{19.18 - 16.6}{6} \sqrt{\frac{0.6}{0.4}}$$

$$r_{pbi} = \frac{2.58}{6} \sqrt{1.5}$$

$$r_{pbi} = 0.43 \times 1.22 = 0.52$$

Item 9

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{19 - 16.6}{6} \sqrt{\frac{0.6}{0.4}}$$

$$r_{pbi} = \frac{2.4}{6} \sqrt{1.5}$$

$$r_{pbi} = 0.4 \times 1.22 = 0.48$$

Item 10

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$
$$r_{pbi} = \frac{19.05 - 16.6}{6} \sqrt{\frac{0.8}{0.2}}$$
$$r_{pbi} = \frac{2.45}{6} \sqrt{4}$$
$$r_{pbi} = 0.40 \text{ x } 2 = 0.8$$

$$\mathbf{r}_{\rm pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{19.05 - 16.6}{6} \sqrt{\frac{0.8}{0.2}}$$

$$r_{pbi} = \frac{2.45}{6} \sqrt{4}$$

$$r_{pbi} = 0.40 \text{ x } 2 = 0.8$$

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{19 - 16.6}{6} \sqrt{\frac{0.6}{0.4}}$$

$$r_{pbi} = \frac{2.4}{6} \sqrt{1.5}$$

$$r_{pbi} = 0.40 \times 1.22 = 0.48$$

Item 13

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{18.25 - 16.6}{6} \sqrt{\frac{0.8}{0.2}}$$

$$r_{pbi} = \frac{1.65}{6} \sqrt{4}$$

$$r_{pbi} = 0.275 \text{ x } 2 = 0.55$$

Item 14

$$r_{pbi} = \frac{\frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}}{r_{pbi}}$$
$$r_{pbi} = \frac{18.83 - 16.6}{6} \sqrt{\frac{0.5}{0.5}}$$
$$r_{pbi} = \frac{2.23}{6} \sqrt{1}$$
$$r_{pbi} = 0.37 \text{ x } 1 = 0.37$$

Item 15

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{19.18 - 16.6}{6} \sqrt{\frac{0.6}{0.4}}$$

$$r_{pbi} = \frac{2.58}{6} \sqrt{1.5}$$

$$r_{pbi} = 0.43 \times 1.22 = 0.52$$

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{19.06 - 16.6}{6} \sqrt{\frac{0.6}{0.4}}$$

$$r_{pbi} = \frac{2.46}{6} \sqrt{1.5}$$

$$r_{pbi} = 0.41 \text{ x } 1.22 = 0.50$$

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{19.18 - 16.6}{6} \sqrt{\frac{0.6}{0.4}}$$

$$r_{pbi} = \frac{2.58}{6} \sqrt{1.5}$$

$$r_{pbi} = 0.43 \times 1.22 = 0.52$$

Item 18

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{19.84 - 16.6}{6} \sqrt{\frac{0.5}{0.5}}$$

$$r_{pbi} = \frac{3.24}{6} \sqrt{1}$$

$$r_{pbi} = 0.54 \times 1 = 0.54$$

Item 19

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{20.14 - 16.6}{6} \sqrt{\frac{0.6}{0.4}}$$

$$r_{pbi} = \frac{3.54}{6} \sqrt{1.5}$$

$$r_{pbi} = 0.59 \times 1.22 = 0.71$$

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{20.14 - 16.6}{6} \sqrt{\frac{0.6}{0.4}}$$

$$r_{pbi} = \frac{3.54}{6} \sqrt{1.5}$$

$$r_{pbi} = 0.59 \times 1.22 = 0.71$$

Item 21 $r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$ $r_{pbi} = \frac{20.14 - 16.6}{6} \sqrt{\frac{0.6}{0.4}}$ $r_{pbi} = \frac{3.54}{6} \sqrt{1.5}$ $r_{pbi} = 0.59 \text{ x } 1.22 = 0.71$

Item 22

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

$$r_{pbi} = \frac{19.18 - 16.6}{6} \sqrt{\frac{0.6}{0.4}}$$

$$r_{pbi} = \frac{2.58}{6} \sqrt{1.5}$$

$$r_{pbi} = 0.43 \times 1.22 = 0.52$$

Item 23

$$r_{pbi} = \frac{\frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}}{r_{pbi}}$$
$$r_{pbi} = \frac{17.08 - 16.6}{6} \sqrt{\frac{0.5}{0.5}}$$
$$r_{pbi} = \frac{0.48}{6} \sqrt{1}$$
$$r_{pbi} = 0.08 \text{ x } 1 = 0.08$$

Item 24 $M_{n} M_{n} \sqrt{n}$

$$r_{pbi} = \frac{\frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}}{r_{pbi}}$$
$$r_{pbi} = \frac{19.84 - 16.6}{6} \sqrt{\frac{0.5}{0.5}}$$
$$r_{pbi} = \frac{3.24}{6} \sqrt{1}$$
$$r_{pbi} = 0.54 \text{ x } 1 = 0.54$$

Item 25

$$r_{pbi} = \frac{M_{p-M_t}}{SD_t} \sqrt{\frac{p}{q}}$$

 $r_{pbi} = \frac{18.25 - 16.6}{6} \sqrt{\frac{0.8}{0.2}}$

$$\begin{aligned} r_{pbi} &= \frac{1.65}{6} \sqrt{4} \\ r_{pbi} &= 0.275 \ x \ 2 = 0.55 \end{aligned}$$

Appendi 13

Table Validity of Post-test

No	M _p	M _t	SD _t	Р	Q	$\Gamma_{\text{pbi}=\frac{M_{\text{p}-M_{\text{t}}}}{\text{SD}_{\text{t}}}}\sqrt{\frac{p}{q}}$	r _t on 5% significant	Interpretation
1.	18.25	16.6	6	0.8	0.2	0.55	0.396	valid
2.	20.14	16.6	6	0.6	0.4	0.71	0.396	valid
3.	18.25	16.6	6	0.8	0.2	0.55	0.396	valid
4.	16.95	16.6	6	0.9	0.1	0.17	0.396	invalid
5.	19.05	16.6	6	0.8	0.2	0.8	0.396	valid
6.	16.90	16.6	6	0.8	0.2	0.1	0.396	invalid
7.	18.15	16.6	6	0.8	0.2	0.5	0.396	valid
8.	19.18	16.6	6	0.6	0.4	0.52	0.396	valid
9.	19	16.6	6	0.6	0.4	0.48	0.396	valid
10.	19.05	16.6	6	0.8	0.2	0.8	0.396	valid
11.	19.05	16.6	6	0.8	0.2	0.8	0.396	valid
12.	19	16.6	6	0.6	0.4	0.48	0.396	valid
13.	18.25	16.6	6	0.8	0.2	0.55	0.396	valid
14.	18.83	16.6	6	0.5	0.5	0.37	0.396	invalid
15.	19.18	16.6	6	0.6	0.4	0.52	0.396	valid
16.	19.06	16.6	6	0.6	0.4	0.50	0.396	valid
17.	19.18	16.6	6	0.6	0.4	0.52	0.396	valid
18.	19.84	16.6	6	0.5	0.5	0.54	0.396	valid
19.	20.14	16.6	6	0.6	0.4	0.71	0.396	valid
20.	20.14	16.6	6	0.6	0.4	0.71	0.396	valid
21.	23.41	16.6	6	0.6	0.4	0.71	0.396	valid
22.	19.18	16.6	6	0.6	0.4	0.52	0.396	valid

23.	17.08	16.6	6	0.5	0.5	0.08	0.396	invalid
24.	19.84	16.6	6	0.5	0.5	0.54	0.396	valid
25.	18.25	16.6	6	0.8	0.2	0.55	0.396	valid

Appendix 14

Realibility of

	No												Ite	em
	110.	1	2	3	4	5	6	7	8	9	10	11	12	1
	1	0	1	0	1	1	1	1	1	1	1	1	1	
	2	1	0	1	1	0	1	1	0	1	0	0	1	
	3	1	0	1	1	0	1	1	0	1	0	0	1	
	4	0	1	0	1	1	1	1	1	0	1	1	0	
	5	1	0	1	1	1	1	1	1	0	1	1	0	
	6	1	1	1	1	1	1	0	0	0	1	1	0	
	7	1	1	1	1	1	1	1	1	1	1	1	1	
	8	1	1	1	1	1	1	1	1	1	1	1	1	
	9	0	0	0	0	1	0	1	1	1	1	1	1	
R	10	1	1	1	1	1	1	0	0	1	1	1	1	
lesp	11	0	0	0	1	0	1	0	0	0	0	0	0	
one	12	1	1	1	0	1	0	1	1	0	1	1	0	
den	13	1	1	1	1	1	1	1	1	1	1	1	1	
1	14	0	0	0	1	0	1	0	0	0	0	0	0	
	15	1	0	1	1	1	1	1	1	1	1	1	1	
	16	1	1	1	1	1	1	1	0	0	1	1	0	
	17	1	0	1	1	1	1	0	0	0	1	1	0	
	18	1	0	1	1	0	1	1	1	0	0	0	0	
	19	1	1	1	1	1	0	1	0	1	1	1	1	
	20	1	0	1	1	1	1	1	1	1	1	1	1	
	21	1	1	1	1	1	1	1	1	1	1	1	1	
	22	1	1	1	1	1	1	1	1	1	1	1	1	
	23	1	0	1	0	0	0	1	1	1	0	0	1	
	24	1	1	1	1	1	1	1	1	1	1	1	1	
	25	1	1	1	1	1	1	0	1	0	1	1	0	
	N=25	20	14	20	22	19	21	19	16	15	19	19	15	2

р	0,8	0,6	0,8	0,9	0,8	0,8	0,8	0,6	0,6	0,8	0,8	0,6	0
q	0,2	0,4	0,2	0,1	0,2	0,2	0,2	0,4	0,4	0,2	0,2	0,4	0
pq	0,16	0,246	0,16	0,106	0,182	0,134	0,182	0,23	0,24	0,182	0,182	0,24	0,

Appendix 15

Reliability of Post Test

To get reliability of the test, the researcher uses formula KR-20:

$\mathbf{R}_{11} = \left(\frac{n}{n-1}\right) \left(\frac{S_{t^2} - \sum pq}{S_{t^2}}\right)$
N= 25
$\sum Xt = 415$
$\sum Xt^2 = 7797$
$\sum pq = 5.226$
$S_t^2 = \sum X t^2 - \left(\frac{\sum xt}{N}\right)^2$
$= 7797 - \left(\frac{415}{25}\right)^2 = 7797 - 16.6^2 = 7797 - 275.56 = 7521.44$
$S_t^2 = \frac{\Sigma X t 2}{N} = \frac{7521.44}{25}$
$S_t^2 = 300.85$
$\mathbf{R}_{11} = \left(\frac{n}{n-1}\right) \left(\frac{S_{t^2} - \sum pq}{S_{t^2}}\right)$
$\mathbf{R}_{11} = \left(\frac{25}{25 - 1}\right) \left(\frac{300.85 - 5.226}{300.85}\right) = \left(\frac{25}{24}\right) \left(\frac{295.624}{300.85}\right)$
= $(1.04) (0.98)$ = $0.98 (r_{11} > 0.70 = reliable)$

APPENDIX 16

RESULT OF NORMALITY TEST IN PRE TEST

RESULT OF THE NORMALITY TEST OF VIII 5 IN PRE-TEST

1. The score of VIII 5 class in pre test from low score to high score:

20	20	25	25	30	30	30	35	35	35
35	35	40	40	40	40	40	40	45	45
45	45	45	50	50	55	55	55		

2. High = 55

Low = 25

Range = High - Low

- = 35
- 3. Total of Classes $= 1 + 3,3 \log(n)$
 - $= 1 + 3,3 \log (28)$ = 1 + 3,3 (1.44) = 1 + 4.75 = 5.75 = 6

4. Length of Classes $=\frac{range}{totalof class}$ $=\frac{35}{6}=6$

5. Mean

Interval Class	F	X	X	fx	x ²	fx ²
20 - 25	4	22.5	+2	8	4	16
26 - 31	3	28.5	+1	3	1	3

32 - 37	5	34.5	0	0	0	0
38 - 43	6	40.5	-1	-6	1	6
44 - 49	5	46.5	-2	-10	4	20
50 - 55	5	52.5	-3	-15	9	45
<i>i</i> = 6	28	-	-	-20	-	90

$$Mx = M^{-1} + i \frac{\Sigma f x^{-1}}{N}$$

$$= 40.5 + 6 \left(\frac{-20}{28}\right)$$

$$= 40.5 + 6 \left(-0.71\right)$$

$$= 40.5 + \left(-4.26\right)$$

$$= 36.24$$

$$SD_{t} = i \sqrt{\frac{\Sigma f x'^{2}}{n} - \left(\frac{\Sigma f x'}{n}\right)^{2}}$$

$$= 6 \sqrt{\frac{90}{28} - \left(\frac{-20}{28}\right)^{2}}$$

$$= 6\sqrt{3.21 - (-0.71)^{2}}$$

$$= 6\sqrt{3.21 - 0.50}$$

$$= 6\sqrt{2.71}$$

$$= 6 \ge 1.64 = 9.84$$

Table of Normality Data Test with Chi Kuadrad Formula

Interval	Real		Limit of	Large of			(f. f.)
of Score	Upper Limit	Z – Score	Large of the	area	$\mathbf{f}_{\mathbf{h}}$	f_0	$\frac{(1_0-1_h)}{f_h}$
	LIIIII		Alea				

50 - 55	55.5	1.95	0.4744				
				0.06	1.68	5	1.97
44 – 49	49.5	1.34	0.4099	0.14	2.20	_	0.51
38 - 13	13.5	0.73	0 2672	0.14	3.29	Э	0.51
50 -5	-3.5	0.75	0.2075	0.21	5.88	6	0.02
32 - 37	37.5	0.12	0.0478				
				-0.13	-3.64	5	-2.37
26 – 31	31.5	-0.48	0.1844	0.17	170	2	1.62
20 - 25	25.5	-1.09	0 2621	-0.17	-4.70	3	-1.03
20 25	23.5	1.07	0.3021	-0.09	-2.52	4	-2.58
	19.5	-1.70	0.4554				
					I	\mathbf{X}^2	-4 08

Based on the table above, the reseracher found that $x_{count}^2 = -4.08$ while $x_{table}^2 = 0.08 \text{ cause } x_{count}^2 < x_{table}^2$ (-4.08<11.070) with degree of freedom (dk) = 6–1 = 5 and significant level $\alpha = 5\%$. So distribution of VIII 4 class (post-test) is normal.

6. Median

No	Interval	F	Fk
1	20 - 25	4	4
2	26 - 31	3	7
3	32 - 37	5	12
4	38 - 43	6	18
5	44 - 49	5	23
6	50 - 55	5	28

Position of Me in the interval of classes is number 3, that:

n = 28
1/2n= 14
So :
Me = Bb + i
$$\left(\frac{n/2 - F}{fm}\right)$$

= 37.5 + 6 $\left(\frac{14-12}{6}\right)$
= 37.5 + 6 (0.33)
= 37.5 + 1.98
= 39.48

7. Modus

No	Interval	F	Fk
1	20 - 25	4	4
2	26-31	3	7
3	32 - 37	5	12
4	38 - 43	6	18
5	44 - 49	5	23
6	50 - 55	5	28

$$M_{o} = L + \frac{d_{1}}{d_{1} + d_{2}}i$$

$$L = 37.5$$

$$d_{1} = 1$$

$$d_{2} = 1$$

$$i = 6$$
So,
$$M_{o} = 37.5 + \frac{1}{1+1} 6$$

$$= 37.5 + 0.5 (6)$$

$$= 37.5 + 3$$

$$= 40.5$$

RESULT OF THE NORMALITY TEST OF VIII 4 IN PRE-TEST

8. The score of VIII 4 class in pre test from low score to high score:

	20	20	25	25	25	30	30	30	30	35
	35	35	35	35	35	40	40	40	45	45
	45	45	45	50	50	50	55	55		
9.	High	=	55							
	Low	=	20							
	Range	=	High	n – Le	OW					
		=	55 -	20						
		=	35							
10.	Total	of Cla	sses	= 1	+ 3,3	8 log	(n)			
				= 1	+ 3,3	log	(28)			

$$= 1 + 3,3 (1.44)$$
$$= 1 + 4.75$$
$$= 5.75$$
$$= 6$$

 $=\frac{range}{totalof class} = \frac{35}{6} = 5,83 = 6$ Length of Classes 11.

12. Mean

9.

Interval Class	F	X	x	fx	x ²	fx ²
20 - 25	5	22.5	+2	10	4	20
26 - 31	4	28.5	+1	4	1	4
32 - 37	6	34.5	0	0	0	0
38-43	3	40.5	-1	-3	-1	3
44 - 49	5	46.5	-2	-10	-4	20
50 - 55	5	52.5	-3	-15	-9	45
<i>i</i> = 6	28	-	-	-14	-	92

$$Mx = M^{-1} + i \frac{\Sigma f x^{-1}}{N}$$

= 34.5 + 6 ($\frac{-14}{28}$)
= 34.5 + 6 (-0.5)

$$= 34.5 + (-3)$$

= 31.5
$$SD_{t} = i\sqrt{\frac{\sum fx'^{2}}{n} - \left(\frac{\sum fx'}{n}\right)^{2}}$$

= $6\sqrt{\frac{92}{28} - \left(\frac{-14}{28}\right)^{2}}$
= $6\sqrt{3.28 - (-0.5)^{2}}$
= $6\sqrt{3.28 - 0.25}$
= $6\sqrt{3.53}$
= $6 \times 1.87 = 11.22$

Table of Normality Data Test with Chi Kuadrad Formula

Interval of Score	Real Upper Limit	Z – Score	Limit of Large of the Area	Large of area	$\mathbf{f}_{\mathbf{h}}$	f_0	$\frac{(f_0-f_h)}{f_h}$
50 - 55	55.5	2.13	0.4834				
44 – 49	49.5	1.60	0.4452	0.03	0.84	5	4.95
				0.08	2.24	5	1.22
38 – 43	43.5	1.06	0.3554	0.15	1.0	2	0.00
32 - 37	37.5	0.53	0.2019	0.15	4.2	3	-0.28
	.			0.20	5.6	6	0.07
26 – 31	31.5	0	0.0000	0.20	5.6	4	-8
20 - 25	25.5	-0.53	0.2019				
				-0.15	-4.2	5	-2.19
	19.5	-1.06	0.3554				
			1	1		X^2	-4.23

Based on the table above, the reseracher found that $x_{count}^2 = -4.23$ while $x_{table}^2 = 0.23 < x_{table}^2 = 0.23 < 11.070$ with degree of freedom (dk) = 6–1 = 5 and significant level $\alpha = 5\%$. So distribution of VIII 6 class (pre-test) is normal.

13.	Median
1	moutun

No	Interval	F	Fk
1	20 - 25	5	5
2	26 - 31	4	9
3	32 - 37	6	15
4	38 - 43	3	18
5	44 - 49	5	23
6	50 - 55	5	28

Position of Me in the interval of classes is number 3, that:

Bb = 31.5
F = 9
fm = 6
i = 6
n = 28
1/2n= 14
So :
Me = Bb + i
$$\left(\frac{n/2 - F}{fm}\right)$$

= 31.5 + 6 $\left(\frac{14-9}{6}\right)$
= 31.5 + 6 (0.83)
= 31.5 + 4.98

14. Modus

No	Interval	F	Fk
1	20 - 25	5	5
2	26 - 31	4	9
3	32 - 37	6	15
4	38 - 43	3	18
5	44-49	5	23
6	50 - 55	5	28

$$M_{o} = L + \frac{d_{1}}{d_{1} + d_{2}}i$$

$$L = 31.5$$

$$d_{1} = 2$$

$$d_{2} = 3$$

$$i = 6$$
So,
$$M_{o} = 31.5 + \frac{2}{2+3} 6$$

$$= 31.5 + 0.4 (6)$$

$$= 31.5 + 2.4$$

$$= 33.9$$

Appendix 17

HOMOGENEITY TEST (PRE-TEST)

Calculation of parameter to get variant of the first class as experimental class sample and variant of the second class as experimental class sample are used homogeneity test by using formula:

$$\mathbf{S}^{2} = \frac{n\Sigma x i^{2} - (\Sigma x i)}{n(n-1)}$$

Hypotheses: H₀ : $\delta_1^2 = \delta_2^2$

$$\mathbf{H}_1 \qquad : \delta_1^2 \neq \delta_2^2$$

A. Variant of the VIII-5 class is:

NO	Xi	Xi ²
1.	20	400
2.	20	400

3.	25	625
4.	25	625
5.	30	900
6.	30	900
7.	30	900
8.	35	1225
9.	35	1225
10.	35	1225
11.	35	1225
12.	35	1225
13.	40	1600
14.	40	1600
15.	40	1600
16.	40	1600
17.	40	1600
18.	40	1600
19.	45	2025
20.	45	2025
21.	45	2025
22.	45	2025
23.	45	2025
24.	50	2500
25.	50	2500
26.	55	3025
27.	55	3025
28.	55	3025
Total	1085	44675

$$N = 28$$

 $\sum xi = 1085$
 $\sum_{xi} 2 = 44675$

So:

$$S^{2} = \frac{n \sum xi^{2} - (\sum xi)}{n(n-1)}$$
$$= \frac{28 (44675) - (1085)^{2}}{28(28-1)}$$
$$= \frac{1250900 - 1177225}{28(27)}$$
$$= \frac{73675}{756}$$

B. Variant of the VIII 4 class is:

NO	Xi	Xi ²
29.	20	400
30.	20	400
31.	25	625
32.	25	625
33.	25	625
34.	30	900
35.	30	900
36.	30	900
37.	30	900
38.	35	1225
39.	35	1225
40.	35	1225
41.	35	1225
42.	35	1225
43.	35	1225
44.	40	1600
45.	40	1600
46.	40	1600
47.	45	2025
48.	45	2025
49.	45	2025
50.	45	2025
51.	45	2025
52.	50	2500
53.	50	2500
54.	50	2500
55.	55	3025
56.	55	3025
Total	1050	42100

N = 28 $\sum xi = 1050$ $\sum_{xi} 2 = 42100$
$$S^{2} = \frac{n \sum xi^{2} - (\sum xi)}{n(n-1)}$$
$$= \frac{28 (42100) - (1050)^{2}}{28(28-1)}$$
$$= \frac{1178800 - 1102500}{28(27)}$$
$$= \frac{76300}{756}$$
$$= 100.92$$

The Formula was used to test the hypothesis was:

 $F = \frac{\textit{The Biggest Variant}}{\textit{The Smallest Variant}}$

VIII 5 and VIII 4 :

 $F = \frac{\textit{The Biggest Variant}}{\textit{The Smallest Variant}}$

So:

$$F = \frac{100.92}{97.45} = 1.03$$

After doing the calculation, researcher found that $F_{count} = 1.03$. It had been compared to F_{table} with α 5% and dk numerator and deminator were same (n₁ and n₂ = 28; dk = 28-1 = 27). From the distribution list F, researcher found that $F_{table} = 2.66$, so $F_{count} < F_{table}$ (1.03< 2.66). It could be concluded that there is no difference variant between the VIII 5 class and VIII 4 class. It means that the variant is homogenous.

Score of Pre-test in Experimental Class and Control Class a. Pre-Test Score of Experimental Class

No	The Name of Students (N)	Pre-Test
1	AFP	30
2	ARH	35
3	AL	25
4	CRS	45
5	DMH	20
6	DSP	55
7	DH	35
8	D	55
9	DDA	45
10	DP	35
11	HSH	30
12	НАН	45
13	HS	40
14	ID	55
15	IIDA	35
16	IL	20
17	ILH	40
18	NPL	45
19	NR	45

20	RA	25
21	SPN	40
22	SAS	40
23	SAH	40
24	SNP	50
25	SA	40
26	WPS	50
27	YTA	30
28	ZS	35
	Total	1085

b. Pre-Test Score of Control Class

No	The Name of Students (N)	Pre-Test
1	ААН	30
2	AFH	30
3	AY	25
4	ALP	55
5	As	20
6	APS	45
7	AAJ	35
8	DAL	30
9	DIS	45
10	DPH	35
11	DAH	30
12	IW	45
13	IrWi	35
14	LJH	35
15	MAS	35
16	MRN	20

17	NJS	35
18	NFL	45
19	PR	45
20	R	25
21	RPH	40
22	RAS	40
23	RS	40
24	ROS	50
25	Ri	35
26	S	50
27	TR	25
28	WR	55
	Total	1085

Score of Post-test in Experimental and Control Class a. Post-Test Score of Experimental Class

No	The Name of Students (N)	Post-Test
1	AFP	50
2	ARH	45
3	AL	50
4	CRS	70
5	DMH	45
6	DSP	70
7	DH	55
8	DI	65
9	DDA	55
10	DP	65
11	HSH	65
12	НАН	55
13	HS	55
14	ID	60
15	I Daud	60
16	IL	45
17	ILH	60
18	NPU	60

19	NR	55
20	RA	65
21	SPN	65
22	SAS	55
23	SAH	65
24	SNP	80
25	SA	75
26	WPS	60
27	YTA	60
28	ZS	45
	Total	1650

b. Post-Test Score of Control Class

No	The Name of Students (N)	Post-Test
1	ААН	50
2	AFH	35
3	AY	30
4	ALP	55
5	As	35
6	APS	55
7	AAJ	40
8	DAL	55
9	DIS	45
10	DPW	35
11	DAH	30
12	IW	45
13	IrWi	40
14	LJLH	60
15	MAS	35
16	MRN	25
17	NJS	40
18	NFL	45

19	PR	45
20	R	25
21	RPH	40
22	RAS	40
23	RS	40
24	RSH	50
25	Ri	45
26	S	50
27	TS	30
28	WR	60
	Total	1160

RESULT OF NORMALITY TEST IN POST TEST

RESULT OF THE NORMALITY TEST OF VIII 5 IN POST-TEST

1. The score of VIII 5 class in pre test from low score to high score:

45	45	45	45	50	50	55	55	55	55
55	55	60	60	60	60	60	60	60	65
65	65	65	65	70	70	75	80		

2. High = 80

```
Low = 45
```

Range = High – Low

= 35

3. Total of Classes $= 1 + 3,3 \log(n)$

$$= 1 + 3,3 \log (28)$$
$$= 1 + 3,3 (1.44)$$

$$= 1 + 4.75$$

 $= 5.75$
 $= 6$

4. Length of Classes $=\frac{range}{totalof class}$ $=\frac{35}{6}=5.83=6$

5. Mean

Interval Class	F	X	X	fx	x ²	fx^2
45 - 50	6	47.5	+3	18	9	54
51 - 56	6	53.5	+2	12	4	24
57 - 62	7	59.5	+1	7	1	7
63 - 68	5	65.5	0	0	0	0
69 - 74	2	71.5	-1	-2	-1	2
75 - 80	2	77.5	-2	-4	-4	8
<i>i</i> = 6	28	-	-	3	-	95

$$Mx = M^{-1} + i \frac{\Sigma f x^{-1}}{N}$$

$$= 59.5 + 6 \left(\frac{3}{28}\right)$$

$$= 59.5 + 6 \left(0.10\right)$$

$$= 59.5 + \left(0.6\right)$$

$$= 60.1$$

$$SD_{t} = i \sqrt{\frac{\Sigma f x'^{2}}{n} - \left(\frac{\Sigma f x'}{n}\right)^{2}}$$

$$= 6 \sqrt{\frac{95}{28} - \left(\frac{3}{28}\right)^{2}}$$

$$= 6\sqrt{3.39 - (0.10)^{2}}$$

$$= 6\sqrt{3.38}$$

$$= 6 \times 1.83 = 10.98$$

|--|

Interval of Score	Real Upper Limit	Z – Score	Limit of Large of the Area	Large of area	$\mathbf{f}_{\mathbf{h}}$	f ₀	$\frac{(f_0-f_h)}{f_h}$
----------------------	------------------------	-----------	----------------------------------	---------------	---------------------------	----------------	-------------------------

75 - 80	80.5	1.85	0.4678				
				0.06	1.68	2	0.19
69 – 74	74.5	1.31	0.4049	0.12	2.26	2	0.40
63 - 68	68.5	0.76	0.2764	0.12	5.50	2	-0.40
00 00	00.0	0170	0.2704	0.19	5.32	5	-0.06
57 - 62	62.5	0.21	0.0832				
51 56	565	0.22	0 1055	-0.04	-1.12	7	-7.25
51 - 50	30.3	-0.52	0.1255	-0.18	-5.04	6	-2.19
45 - 50	50.5	-0.87	0.3078	0.10	5.01	Ŭ	2.17
				-0.11	-3.08	6	-2.94
	44.5	-1.42	0.4222				
				•	•	X^2	-12.65

Based on the table above, the reseracher found that $x_{count}^2 = -12.65$ while $x_{table}^2 = 0.265 < 11.070$ with degree of freedom (dk) = 6–1 = 5 and significant level $\alpha = 5\%$. So distribution of VIII 5 class (pre-test) is normal.

6. Median

No	Interval	F	Fk
1	45 - 50	6	6
2	51 - 56	6	12
3	57 - 62	7	19
4	63 - 68	5	24
5	69 - 74	2	26
6	75 - 80	2	28

Position of Me in the interval of classes is number 4, that:

Bb = 56.5F = 12fm = 7i = 6

RESULT OF THE NORMALITY TEST OF VIII 4 IN POST-TEST

$$= 56.5 + 0.33 (6)$$
$$= 56.5 + 1.98$$

 $565 \pm 0.33(6)$

$$H_0 = 50.5 + 1+2$$

= 58.48

$$M_0 = 56.5 + \frac{1}{1+2} 6$$

L = 56.5

 $d_1 = 1$

 $d_2 = 2$

So,

7. Modus

n = 28
1/2n= 14
So :
Me = Bb + i
$$\left(\frac{n/2 - F}{fm}\right)^{-F}$$

= 56.5 + 6 $\left(\frac{14-12}{7}\right)^{-F}$
= 39.5 + 6 (0.28)
= 56.5 + 1.68
= 58.18

8. The score of VIII 4 class in pre test from low score to high score:

25	25	30	30	30	35	35	35	35	35
40	40	40	40	40	40	45	45	45	45
45	50	50	50	55	55	60	60		

9. High = 60 = 25 Low Range = High - Low = 60 - 25 = 35 10. Total of Classes $= 1 + 3,3 \log(n)$ $= 1 + 3,3 \log(28)$ = 1 + 3,3 (1.44)= 1 + 4.75= 5.75 = 6 11. Length of

Classes
$$=\frac{range}{totalof class}$$
 $=\frac{35}{6}=5.83=6$

12. Mean

Interval Class	F	Х	x	fx	x ²	fx ²
25 - 30	5	27.5	+2	10	4	20
31 – 36	5	33.5	+1	5	1	5
37 - 42	6	39.5	0	0	0	0
43 - 48	5	45.5	-1	-5	1	5
49 - 54	3	51.5	-2	-6	4	12
55 - 60	4	57.5	-3	-12	9	36
<i>i</i> = 6	28	-	-	-8	-	78

$$Mx = M^{-1} + i \frac{\Sigma f x^{-1}}{N}$$

= 39.5 + 6 ($\frac{-8}{28}$)
= 39.5 + 6 (-0.28)
= 39.5 + (-1.68)
= 37.82

$$SD_{t} = i\sqrt{\frac{\sum fxr^{2}}{n} - \left(\frac{\sum fxr}{n}\right)^{2}}$$
$$= 6\sqrt{\frac{78}{28} - \left(\frac{-8}{28}\right)^{2}}$$
$$= 6\sqrt{2.78 - (-0.28)^{2}}$$
$$= 6\sqrt{2.78 - 0.078}$$
$$= 6\sqrt{2.858}$$
$$= 6 \ge 10.14$$

Interval of Score	Real Upper Limit	Z – Score	Limit of Large of the Area	Large of area	$\mathbf{f}_{\mathbf{h}}$	f_0	$\frac{(f_{\underline{0}}\underline{-}f_{\underline{h}})}{f_{\underline{h}}}$
55 - 60	60.5	2.23	0.4871				
				0.03	0.84	4	3.76
49 - 54	54.5	1.64	0.4495				
				0.09	2.52	3	0.19
43 - 48	48.5	1.05	0.3531				
				0.17	4.76	5	0.05
37 - 42	42.5	0.46	0.1772				
			0.11/12	0.12	3.36	6	0.78
31 – 36	36.5	-0.13	0.0517				
			010017	-0.20	-5.6	5	-1.89
25 - 30	30.5	-0.72	0.2612				
			0.2012	-0.14	-3.92	5	-2.27
	24.5	-1.31	0.4049				
			0.1012				
		•				X^2	0.62

Table of Normality Data Test with Chi Kuadrad Formula

Based on the table above, the reseracher found that $x_{count}^2 = 0.62$ while $x_{table}^2 = 0.62$, cause $x_{count}^2 < x_{table}^2 = 0.62 < 11.070$ with degree of freedom (dk) = 6–1 = 5 and significant level $\alpha = 5\%$. So distribution of VIII 5 class (pre-test) is normal.

^{13.} Median

No	Interval	F	Fk
1	25 - 30	5	5

2	31 – 36	5	10
3	37 - 42	6	16
4	43 - 48	5	21
5	49 - 54	3	24
6	55 - 60	4	28

Position of Me in the interval of classes is number 4, that:

Bb = 36.5
F = 10
fm = 6
i = 6
n = 28
1/2n= 14
So :
Me = Bb + i
$$\left(\frac{n/2 - F}{fm}\right)$$

= 36.5 + 6 $\left(\frac{14-10}{6}\right)$
= 36.5 + 6 (0.67)
= 36.5 + 4.02

= 40.52 14. Modus

No	Interval	F	Fk
1	25 - 30	5	5
2	31 – 36	5	10
3	37 - 42	6	16
4	43 - 48	5	21
5	49 - 54	3	24
6	55 - 60	4	28

$$M_{o} = L + \frac{d_{1}}{d_{1} + d_{2}}i$$
$$L = 36.5$$

 $\begin{array}{ll} d_1 &= 1 \\ d_2 &= 1 \\ i &= 6 \\ So, \\ M_o &= 36.5 + \frac{1}{1+1} \ 6 \\ &= 36.5 + 0.5 \ (6) \\ &= 36.5 + 3 \\ &= 39.5 \end{array}$

Appendix 21

HOMOGENEITY TEST (POST-TEST)

Calculation of parameter to get variant of the first class as experimental class sample and variant of the second class as experimental class sample are used homogeneity test by using formula:

$$\mathbf{S}^{2} = \frac{n \sum xi^{2} - (\sum xi)}{n(n-1)}$$

Hypotheses: H₀ : $\delta_1^2 = \delta_2^2$

H₁ : $\delta_1^2 \neq \delta_2^2$

C. Variant of the VIII-5 class is:

NO	Xi	Xi ²
1.	45	2025
2.	45	2025
3.	45	2025
4.	45	2025
5.	50	2500
6.	50	2500

7.	55	3025
8.	55	3025
9.	55	3025
10.	55	3025
11.	55	3025
12.	55	3025
13.	60	3600
14.	60	3600
15.	60	3600
16.	60	3600
17.	60	3600
18.	60	3600
19.	60	3600
20.	65	4225
21.	65	4225
22.	65	4225
23.	65	4225
24.	65	4225
25.	70	4900
26.	70	4900
27.	75	5625
28.	80	6400
Total	1650	99400

n = 28

$$\sum xi = 1650$$

 $\sum_{Xi} 2 = 99400$

So:

$$S^{2} = \frac{n\Sigma xi^{2} - (\Sigma xi)}{n(n-1)}$$
$$= \frac{28(99400) - (1650)^{2}}{28(28-1)}$$
$$= \frac{2783200 - 2722500}{28(27)}$$
$$= \frac{60700}{756}$$
$$= 80.29$$

D. Variant of the VIII 4 class is:

NO	Xi	Xi ²
29.	25	625
30.	25	625
31.	30	900
32.	30	900
33.	30	900
34.	35	1225
35.	35	1225
36.	35	1225
37.	35	1225
38.	35	1225
39.	40	1600
40.	40	1600
41.	40	1600
42.	40	1600
43.	40	1600
44.	40	1600
45.	45	2025
46.	45	2025
47.	45	2025
48.	45	2025
49.	45	2025
50.	50	2500
51.	50	2500
52.	50	2500
53.	55	3025
54.	55	3025
55.	60	3600
56.	60	3600
Total	1160	50550

$$n = 28$$
$$\sum xi = 1160$$

 $\sum_{Xi} 2 = 50550$

So:

$$S^{2} = \frac{n \sum xi^{2} - (\sum xi)}{n(n-1)}$$
$$= \frac{28(50550) - (1160)^{2}}{28(28-1)}$$

$$=\frac{1415400-1345600}{28(27)}$$
$$=\frac{69800}{756}$$
$$= 92.32$$

The Formula was used to test the hypothesis was:

 $F = \frac{\textit{The Biggest Variant}}{\textit{The Smallest Variant}}$

VIII 5 and VIII 4 :

$$F = \frac{The Biggest Variant}{The Smallest Variant}$$

So:

$$F = \frac{92.32}{80.29} = 1.14$$

After doing the calculation, researcher found that $F_{count} = 1.14$. It had been compared to F_{table} with α 5% and dk numerator and deminator were same (n₁ and n₂ = 28; dk = 28-1 = 27). From the distribution list F, researcher found that $F_{table} = 2.66$, so $F_{count} < F_{table}$ (1.14< 2.66). It could be concluded that there is no difference variant between the VIII 5 class and VIII 4 class. It means that the variant is homogenous.

T-test of the Both Averages in Pre-Test

The formula was used to analyse homogeneity test of the both averages was t-

test, that:

$$Tt = \frac{X_1 - X_2}{\sqrt{\left(\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}\right)\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$
$$Tt = \frac{31.5 - 36.24}{\sqrt{\left(\frac{(28 - 1)92.32 + (28 - 1)100.92}{28 + 28 - 2}\right)\left(\frac{1}{28} + \frac{1}{28}\right)}}$$
$$Tt = \frac{-4.74}{\sqrt{\left(\frac{27(97.45) + 27(100.92)}{54}\right)\left(\frac{2}{28}\right)}}$$
$$Tt = \frac{-4.74}{\sqrt{\left(\frac{2631.15 + 2724.84}{54}\right)(0.07)}}$$

$$Tt = \frac{-4.74}{\sqrt{(99.18)(0.07)}}$$
$$Tt = \frac{-4.74}{\sqrt{6.94}}$$
$$Tt = \frac{-4.74}{2.63}$$
$$Tt = -1.80$$

Based on researcher calculation result of homogeneity test of the both averages, researcher found that $t_{count} = -1.80$ with opportunity $(1-\alpha) = 1 - 5\% =$ 95% and dk = $n_1 + n_2 - 2 = 28 + 28 - 2 = 54$, $t_{table} = 1.67356$. So, $t_{count} < t_{table}(-1.80 < 1.67356)$ and H₀ is accepted, it means no difference the average between the first class as experimental class and the second class as control class in this research.

T-test of the Both Averages in Post-Test

The formula was used to analyse homogeneity test of the both averages was ttest, that:

$$Tt = \frac{X_1 - X_2}{\sqrt{\left(\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}\right)\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$
$$Tt = \frac{60.1 - 37.82}{\sqrt{\left(\frac{(28 - 1)80.29 + (28 - 1)92.32}{28 + 28 - 2}\right)\left(\frac{1}{28} + \frac{1}{28}\right)}}$$
$$Tt = \frac{22.28}{\sqrt{\left(\frac{27(80.29) + 27(92.32)}{54}\right)\left(\frac{2}{28}\right)}}$$
$$Tt = \frac{22.28}{\sqrt{\left(\frac{2167.83 + 2492.64}{54}\right)(0.07)}}$$

$$Tt = \frac{22.28}{\sqrt{(86.30)(0.07)}}$$
$$Tt = \frac{22.28}{\sqrt{6.04}}$$
$$Tt = \frac{22.28}{2.45}$$

Tt = 9.09

Based on researcher calculation result of homogeneity test of the both averages, researcher found that t_{count} = 9.58 with opportunity (1- α) = 1 - 5% = 95% and $dk = n_1 + n_2 - 2 = 28 + 28 - 2 = 54$, $t_{table} = 1.67356$. So, $t_{count} > t_{table}(9.09)$ >1.67356) and H_a is accepted, it means there was the difference average between the first class as experimental class and the second class as control class in this research.

_	Chi-Square Table								
dk		Significant level							
	50%	30%	20%	10%	5%	1%			
1	0,455	1,074	1,642	2,706	3,841	6,635			
2	1,386	2,408	3,219	4,605	5,991	9,210			
3	2,366	3,665	4,642	6,251	7,815	11,341			
4	3,357	4,878	5,989	7,779	9,488	13,277			
5	4,351	6,064	7,289	9,236	11,070	15,086			
6	5,348	7,231	8,558	10,645	12,592	16,812			
7	6,346	8,383	9,803	12,017	14,067	18,475			
8	7,344	9,524	11,030	13,362	15,507	20,090			
9	8,343	10,656	12,242	14,684	16,919	21,666			
10	9,342	11,781	13,442	15,987	18,307	23,209			
11	10,341	12,899	14,631	17,275	19,675	24,725			

Appendix 24

12	11,340	14,011	15,812	18,549	21,026	26,217
13	12,340	15,119	16,985	19,812	22,362	27,688
14	13,339	16,222	18,151	21,064	23,685	29,141
15	14,339	17,222	19,311	22,307	24,996	30,578
16	15,338	18,418	20,465	23,542	26,296	32,000
17	16,338	19,511	21,615	24,769	27,587	33,409
18	17,338	20,601	22,760	25,989	28,869	34,805
19	18,338	21,689	23,900	27,204	30,144	36,191
20	19,337	22,775	25,038	28,412	31,410	37,566
21	20,337	23,858	26,171	29,615	32,671	38,932
22	21,337	24,939	27,301	30,813	33,924	40,289
23	22,337	26.018	28,429	32,007	35,172	41,638
24	23,337	27,096	29,553	33,196	35,415	42,980
25	24,337	28,172	30,675	34,382	37,652	44,314
26	25,336	29,246	31,795	35,563	38,885	45,642
27	26,336	30,319	32,912	36,741	40,113	46,963
28	27,336	31,391	34,027	37,916	41,337	48,278
29	28,336	32,461	35,139	39,087	42,557	49,588
30	29,336	33,530	36,250	40,256	43,773	50,892

Z-Table

Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753

r										ar
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	0.2580	0.2611	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2967	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
l –		1	L	1			1	1	1	

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2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990
3,1	0,4990	0,4991	0,4991	0.4991	0,4992	0,4992	0,4992	0,4992	0,4993	0,4993
3,2	0,4993	0,4993	0,4994	0,4994	0,4994	0,4994	0,4994	0,4995	0,4995	0,4995
3,3	0,4995	0,4995	0,4995	0,4996	0,4996	0,4996	0,4996	0,4996	0,4997	0,4997
3,4	0,4997	0,4997	0,4997	0,4997	0,4997	0,4997	0,4997	0,4997	0,4997	0,4998
3,5	0,4998	0,4998	0,4998	0,4998	0,4998	0,4998	0,4998	0,4998	0,4998	0,4998
3,6	0,4998	0,4998	0,4999	0,4999	0,4999	0,4999	0,4999	0,4999	0,4999	0,4999
3,7	0,4999	0,4999	0,4999	0,4999	0,4999	0,4999	0,4999	0,4999	0,4999	0,4999
3,8	0,4999	0,4999	0,4999	0,4999	0,4999	0,4999	0,4999	0,4999	0,4999	0,4999
3,9	0,5000	0,5000	0,5000	0,5000	0,5000	0,5000	0,5000	0,5000	0,5000	0,5000

Percentage Points of the t Distribution

Pr	0.25	0.10	0.05	0.025	0.01	0.005	0.001
df	0.50	0.20	0.10	0.050	0.02	0.010	0.002
1	1.00000	3.07768	6.31375	12.70620	31.82052	63.65674	318.30884
2	0.81650	1.88562	2.91999	4.30265	6.96456	9.92484	22.32712
3	0.76489	1.63774	2.35336	3.18245	4.54070	5.84091	10.21453
4	0.74070	1.53321	2.13185	2.77645	3.74695	4.60409	7.17318
5	0.72669	1.47588	2.01505	2.57058	3.36493	4.03214	5.89343
6	0.71756	1.43976	1.94318	2.44691	3.14267	3.70743	5.20763
7	0.71114	1.41492	1.89458	2.36462	2.99795	3.49948	4.78529
8	0.70639	1.39682	1.85955	2.30600	2.89646	3.35539	4.50079
9	0.70272	1.38303	1.83311	2.26216	2.82144	3.24984	4.29681
10	0.69981	1.37218	1.81246	2.22814	2.76377	3.16927	4.14370
11	0.69745	1.36343	1.79588	2.20099	2.71808	3.10581	4.02470
12	0.69548	1.35622	1.78229	2.17881	2.68100	3.05454	3.92963
13	0.69383	1.35017	1.77093	2.16037	2.65031	3.01228	3.85198
14	0.69242	1.34503	1.76131	2.14479	2.62449	2.97684	3.78739
15	0.69120	1.34061	1.75305	2.13145	2.60248	2.94671	3.73283
16	0.69013	1.33676	1.74588	2.11991	2.58349	2.92078	3.68615
17	0.68920	1.33338	1.73961	2.10982	2.56693	2.89823	3.64577
18	0.68836	1.33039	1.73406	2.10092	2.55238	2.87844	3.61048
19	0.68762	1.32773	1.72913	2.09302	2.53948	2.86093	3.57940
20	0.68695	1.32534	1.72472	2.08596	2.52798	2.84534	3.55181
21	0.68635	1.32319	1.72074	2.07961	2.51765	2.83136	3.52715
22	0.68581	1.32124	1.71714	2.07387	2.50832	2.81876	3.50499
23	0.68531	1.31946	1.71387	2.06866	2.49987	2.80734	3.48496
24	0.68485	1.31784	1.71088	2.06390	2.49216	2.79694	3.46678
25	0.68443	1.31635	1.70814	2.05954	2.48511	2.78744	3.45019
26	0.68404	1.31497	1.70562	2.05553	2.47863	2.77871	3.43500
27	0.68368	1.31370	1.70329	2.05183	2.47266	2.77068	3.42103
28	0.68335	1.31253	1.70113	2.04841	2.46714	2.76326	3.40816
29	0.68304	1.31143	1.69913	2.04523	2.46202	2.75639	3.39624
30	0.68276	1.31042	1.69726	2.04227	2.45726	2.75000	3.38518
31	0.68249	1.30946	1.69552	2.03951	2.45282	2.74404	3.37490
32	0.68223	1.30857	1.69389	2.03693	2.44868	2.73848	3.36531
33	0.68200	1.30774	1.69236	2.03452	2.44479	2.73328	3.35634
34	0.68177	1.30695	1.69092	2.03224	2.44115	2.72839	3.34793
35	0.68156	1.30621	1.68957	2.03011	2.43772	2.72381	3.34005
36	0.68137	1.30551	1.68830	2.02809	2.43449	2.71948	3.33262

0.68118	1.30485	1.68709	2.02619	2.43145	2.71541	3.32563
0.68100	1.30423	1.68595	2.02439	2.42857	2.71156	3.31903
0.68083	1.30364	1.68488	2.02269	2.42584	2.70791	3.31279
0.68067	1.30308	1.68385	2.02108	2.42326	2.70446	3.30688
0.68052	1.30254	1.68288	2.01954	2.42080	2.70118	3.30127
0.68038	1.30204	1.68195	2.01808	2.41847	2.69807	3.29595
0.68024	1.30155	1.68107	2.01669	2.41625	2.69510	3.29089
0.68011	1.30109	1.68023	2.01537	2.41413	2.69228	3.28607
0.67998	1.30065	1.67943	2.01410	2.41212	2.68959	3.28148
0.67986	1.30023	1.67866	2.01290	2.41019	2.68701	3.27710
0.67975	1.29982	1.67793	2.01174	2.40835	2.68456	3.27291
0.67964	1.29944	1.67722	2.01063	2.40658	2.68220	3.26891
0.67953	1.29907	1.67655	2.00958	2.40489	2.67995	3.26508
0.67943	1.29871	1.67591	2.00856	2.40327	2.67779	3.26141
0.67933	1.29837	1.67528	2.00758	2.40172	2.67572	3.25789
0.67924	1.29805	1.67469	2.00665	2.40022	2.67373	3.25451
0.67915	1.29773	1.67412	2.00575	2.39879	2.67182	3.25127
0.67906	1.29743	1.67356	2.00488	2.39741	2.66998	3.24815
0.67898	1.29713	1.67303	2.00404	2.39608	2.66822	3.24515
0.67890	1.29685	1.67252	2.00324	2.39480	2.66651	3.24226
0.67882	1.29658	1.67203	2.00247	2.39357	2.66487	3.23948
0.67874	1.29632	1.67155	2.00172	2.39238	2.66329	3.23680
0.67867	1.29607	1.67109	2.00100	2.39123	2.66176	3.23421
0.67860	1.29582	1.67065	2.00030	2.39012	2.66028	3.23171
	0.68118 0.68100 0.68083 0.68067 0.68052 0.68038 0.68024 0.68011 0.67998 0.67986 0.67975 0.67964 0.67953 0.67943 0.67943 0.67943 0.67915 0.67906 0.67898 0.67890 0.67898 0.67874 0.67867 0.67860	0.681181.304850.681001.304230.680831.303640.680671.303080.680521.302540.680521.302540.680381.302040.680241.301550.680111.301090.679981.300650.679861.300230.679751.299820.679641.299440.679531.298710.679641.299470.679641.298370.679641.298050.679151.297730.679061.297430.679061.297430.678981.296850.678741.296320.678671.296070.678601.29582	0.681181.304851.687090.681001.304231.685950.680831.303641.684880.680671.303081.683850.680521.302541.682880.680381.302041.681950.680241.301551.681070.680111.301091.680230.679981.300651.679430.679861.300231.678660.679751.299821.677930.679641.299441.677220.679531.298711.675510.679431.298711.675280.679441.297731.674120.679551.297731.674120.679061.297431.673030.678981.297131.673030.678901.296851.672520.678741.296321.671090.678601.295821.67065	0.681181.304851.687092.026190.681001.304231.685952.024390.680831.303641.684882.022690.680671.303081.683852.021080.680521.302541.682882.019540.680381.302041.681952.018080.680241.301551.681072.016690.680111.301091.680232.015370.679981.300651.679432.014100.679861.300231.678662.012900.679751.299821.677932.011740.679641.299441.677222.010630.679531.299071.676552.009580.679431.298711.675912.008560.679151.298371.675282.007580.679241.298051.674692.006650.679151.297731.673032.004040.678981.297131.673032.004040.678901.296851.672032.002470.678671.296071.671092.001000.678601.295821.670652.0030	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

RESEARCH DOCUMENTATION





