THE EFFECT OF PUZZLE MEDIA TO STUDENTS' VOCABULARY MASTERY AT EIGHTH GRADE OF MTs N 2 PADANGSIDIMPUAN

A THESIS

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

Written By:

NURMALA SARI
Reg. No. 11 340 0027

ENGLISH EDUCATION DEPARTMENT

TARBIYAH AND TEACHER TRAINING FACULTY
STATE INSTITUTE FOR ISLAMIC STUDIES
PADANGSIDIMPUAN
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Assalamu'alaikum Wr. Wb.

After reading, studying and giving advice for necessary revise on thesis belongs to NURMALA SARI, entitle "*The Effect of Puzzle Media to Students' Vocabulary Mastery at Eighth Grade of MTs N 2 Padangsidimpuan*", we assume that the thesis has been acceptable to complete the assignment and fulfill for the degree of Islamic Educational Scholar (S.Pd.I) in English, Tarbiyah and Teacher Training Faculty in IAIN Padangsidimpuan.

Therefore, we hoped she could be defined her thesis in Munaqosyah. That is all and thank you for the selection.

Wassalamu'alaikum Wr. Wb.

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The Thesis had been accepted as a partial fulfillment of the requirement for the degree of graduate of Islamic education (S.Pd.I) in English

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ACKNOWLEDGEMENT

بِسْمِ ٱللَّهِ ٱلرَّحْمَٰنِ لرَّحِيمِ

Praised be to Allah swt, the most Creator and Merciful who has given me the health, time, knowledge and strength to finish the thesis entitled "The Effect of Puzzle Media to Students' Vocabulary Mastery at Eighth Grade of MTs N 2 Padangsidimpuan". Besides, peace and greeting be upon to the prophet Muhammad saw that has brought the human from the darkness era into the lightness era.

It is a pleasure to acknowledgement the help and contribution to all of lecturers, institution, family and friends who have contributed in different ways hence this thesis is processed until it becomes a complete writing. In this process of finishing this thesis, I got a lot of guidance and motivation from many people. Therefore, in this chance I would like to express my deepest gratitude to the following people:

1. Mrs. Eka Sustri Harida, M. Pd., as the first advisor and Mrs. Fitri Rayani Siregar, M. Hum., as the second advisor who had guided, supported and suggested me with great patience to finish this thesis as well.
2. The Rector of IAIN Padangsidimpuan, Dr. H. Ibrahim Siregar, MCL., who has given chance and time. Therefore, I could learn and got some knowledge from IAIN Padangsidimpuan.
3. Mrs. Hj. Zulhimma, S. Ag., M. Pd., the Dean of Tarbiyah and Teacher Training Faculty.

4. Mrs. Rayendriani Fahmei Lubis, M.Ag., the Chief of English Education Department and also as my beloved advisor academic who gladly supported and counseled me till finishing my studying.
5. The chief of Library, Yusri Fahmi, S. Ag., M. Hum., for their cooperative and permission to use the books.
6. All lecturers and all the academic employee of IAIN Padangsidimpuan who had given so much knowledge and helped during I studied in this beloved institute.
7. My beloved parent, (Bapak Alm. H.Bahari Ritonga and Ibu Paridah Ariati) who taught me how to survive in leading the life and always be patient and sincere to guard me in all of conditions, and always pray me to get better, my beloved Brothers (Ahmad Halim, Pardamean, and Borkat Hidayat) and my beloved sisters (Netti Heri Yani, Masriani, Miftahul Jannah, Nadiatul Husna, Hasripatur Rizkiyah, and Tukma Rahmadani) who always give their materials, prays, motivation, and moral encouragement to finish my study. Thanks for everything.
8. My lovely friends Mei Astuti Srg, Desi Hardiani Hrp, Nurlismi, Fitriyanti, Nur Inayah, Yeni Maryani Rambe, Yaspiah, and all of my friends in TBI-1 and also all of my friends in IAIN Padangsidimpuan, thanks for your help, patience and care to support me from starting till finishing my thesis as well. Good luck for you.

9. All of the people who have helped me to finish my study that I cannot mention one by one.

I realize this thesis cannot be considered perfect without critiques and suggestions. Therefore, it is such a pleasure for me to get critiques and suggestions from the readers to make this thesis better.

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ABSTRACT

This research focused about the effect of Puzzle Media to Students' Vocabulary Mastery at Eighth Grade of MTs N 2 Padangsidimpuan. The problems of this research were most of students have lack vocabularies, got bored in learning, and uninterested in teacher's teaching media. The purpose of this research was to find out the effect of puzzle media to students' vocabulary mastery at eighth grade of MTs N 2Padangsidimpuan.

This research employed experimental research. The population of this research was the eighth grade of MTs N 2Padangsidimpuan. The total of population were four classes. Then, the sample of the research was 2 classes, experiment class (VIII-1) and control class (VIII-2). It was taken randomly after conducting normality and homogeneity test. To collect the data, researcher used test for measuring students' vocabulary mastery. To analize the data, the researcher used t-test.

Based on the result of the research, researcher showed the description of the data was found that the result of experimental class was higher than control class (83.75 >63.7), and the score of t_{count} was bigger than t_{table}(39.94>2.000). It means that the hypothesis alternative (H_a) was accepted. It was concluded that there was the significant effect of puzzle media to Students' Vocabulary Mastery at Eighth Grade of MTs N 2 Padangsidimpuan.

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CHAPTER I

INTRODUCTION

A. Background of the Problem

English considered to be foreign language and also called as the target language that has to be taught in schools from Elementary school up to the University level in Indonesia. English is also one of the subject that must study based on the education curriculum. The last, English is requirement of graduation from schools. So, students must study and mastery the English lesson.

Teaching of English includes four skills namely speaking, listening, reading, and writing. The first, speaking is the ability to communicate orally to express ideas or feeling. The second, listening is the ability to make sense of what hear and connect it to other information that already known. The third, reading is the ability to make the messages or information that comes from the author can be understood and comprehended by the reader. The last, writing is the ability to inventing ideas by statements and paragraphs that will be clear to a reader.

The four skills are supported by learning of language elements; they are structure, grammar, vocabulary, and pronunciation. Vocabulary is one of the important language elements that should developed by students. Vocabulary is very crucial in order to construct the phrases, clauses, sentences, and paragraphs that are used in speaking, listening, reading, and

writing. Students cannot do anything with four skills if they do not know vocabulary and any single words well. However, mastering English vocabulary is not easy for Indonesian students because English absolutely different with Indonesian language. They are different in spelling, pronunciation and meaning. So, to achieve the language skills, Indonesian students should have learned a lot of about English vocabulary.

Teaching English to students Junior high school is not easy because the students are generally aggressive, move from one place to another places, disturb their friends or eating snacks in the classroom when the teacher explained the lesson. A good English teacher must able to control the students and make them interest to the lesson, get the students to be enjoyable in learning, friendly, and respect. That is the reason why the teacher must have ability to create the technique and friendly environment to stimulate the students, maintain interest to various activities and give the students successful in learning.

The problems have been seen by the researcher in MTs N 2 Padangsidimpuan at VIII grade students. When the researcher asked the teacher of the eighth grade, the teacher said: "the students have less vocabulary."[1] Many students have less vocabulary as a result they did not know the meaning of what they have been read or listened. Finally, most of

[1] Rafni Dewi Yanti Tanjung, English Teacher at Grade VIII of MTs N 2 Padangsidimpuan, *Private Interview* (MTs N 2 Padangsidimpuan, April 13, 2014 at 10.15 a.m).

them said, “English subject is difficult”. So that, they are lazy in learning English.

Further, the difficulties of students in learning English not only come from students themselves, but also from other, such as environment, method, media, technique and so on. In environment, students master the English if their friends also master the English. While in method, technique and media, it comes from how the teacher teaches the students.

When the teacher teaches English, the students just listen and repeat. They did not know the meaning of what their teacher said. The students also difficult in remembering the vocabulary. So, when the teacher gives task, many students cheat their friends’ task. In this condition, the teacher doesn’t have a good technique in teaching English. It can make students boring, spent time, and tired. Therefore, students will be lazy in studying it.

According to the explanation above, the researcher has a notion that using many kinds of media in teaching vocabulary can help the students in learning vocabulary. By using the effective media, it is hoped to be a better supporting for them and get their pay attention more to the subject.

Actually, there are many kinds of media that can be used in teaching process. Tarigan says “siswa suka bermain games dan mereka bisa memahami dan melatih technique using words, puzzle, crossword puzzle,

anagram, dan palindrom.[2] From Tarigan's statement above, the researcher tried to present one of the media that can use by English teacher in teaching vocabulary is puzzle. Adenan says "Puzzle and games are materies to support ourselves factly and strong tractive power.[3] So, its can invite students' motivation and will be success in learning.

This research done because the researcher was interest to know how that puzzle relevant or not to be an effective media or how the effect of puzzle in teaching vocabulary. This research title was: **"The Effect of Puzzle Media to Students' Vocabulary Mastery at Eighth Grade of MTs N 2 Padangsidimpuan".**

B. Identification of the Problem

Based on the background of the problem above, the researcher identified that students of eighth grade of MTs N 2 Padangsidimpuan have lack vocabularies, got bored in learning, and uninterested in teacher's teaching media.

C. Limitation of the Problem

Based of the identification of the problem above, the factor in teaching vocabulary should find an approach, strategies, teachnique, method, and media. Here, the researcher did not discuss all the factors. The researcher only discuss one factor that is media.

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[2] Tarigan, *Pengajaran Gaya Bahasa* (Bandung: Angkasa, 1986) p. 234
[3] Adenan, *Puzzle and Games for Students of IKP,* (Yogyakarta: Kanisius, 1984) p. 9

There are many kinds of media that can use in teaching vocabulary, such as, pictures, song, text, crossword puzzle, puzzle, and soon. In this research, the researcher has chose puzzle as a media in teaching vocabulary. There are some kinds of puzzle, spelling puzzle, jigsaw puzzle, the thing puzzle, the readiness puzzle, and crossword puzzle. In this research, the researcher focus on spelling puzzle.

Same as the media, the researcher also limited or focussed the vocabulary on countable and uncountable noun. So, the researcher supposed to know or find the efffect of puzzle on students' vocabulary mastery in countable and uncountable noun at eighth grade of MTs N 2 Padangsidimpuan.

D. Formulation of the Research

In this study, there was question would be analyzed as the formulation of the problem: "Was there the significant effect of using puzzle media to students' vocabulary mastery at eighth grade of MTs N 2 Padangsidimpuan?"

E. The Aim of the Research

Based on the formulation of the problem above, the aim of the research Was: "To examine the significant effect of puzzle media to students' vocabulary mastery at eighth grade of MTs N 2 Padangsidimpuan".

F. Significances of the Research

Significances of the research are:

1. For the headmaster of MTs N 2 Padangsidimpuan to give direction to the English teacher about the English teaching media that is suitable to students' situation and materials of the learning, so that can improve the students' interesting in learning English.
2. For the English teacher of MTs N 2 Padangsidimpuan, this study can help to improve the quality of teaching and learning process.
3. For others, this study can be an information for who want to do the research related with this research.

G. Definition of Operational Variables

To avoid misunderstanding and misinterpretation in this study, there are two variables that researcher defined in specific terms as follow:

1. **Puzzle** adalah teka teki berupa gambar yang dapat merangsang anak untuk berpikir.
2. **Students' Vocabulary Mastery** is students' ability to understand the list of word and also the meaning. It's very important part in the four English skills; speaking, listening, reading, and writing.

H. Outline of the Thesis

The outline of this research divided into five chapters. In the first chapter discussed about background of the problems, identification of the problems, limitation of the problems, formulation of the research, the aim of the research, significances of the research, and definition of operational variables.

The second chapter consisted of theoretical description. It included of puzzle media (the concept of puzzle media, kinds of puzzle, advantages and disadvantages of puzzle, principles of puzzle design, and steps of puzzle), vocabulary mastery (definition of vocabulary mastery, kinds of vocabulary, classification of vocabulary (definition of noun and kinds of noun), teaching vocabulary, principles of teaching vocabulary, and media in teaching vocabulary, review of related findings, conceptual framework and hypothesis.

The third chapter was about the research methodology. It included research design, place and time of the research, population and sample, instrumentation of collecting data, validity and reliability instrument, procedures of the research, technique for collecting the data, and technique for data analysis.

The forth chapter consisted of the result of the research. It consist of description of the data, hypothesis testing, discussion and the threats of the research.

In the last chapter consisted of conclusion that is giving conclusion about the result of the research and suggestion that is given to students and teacher by the researcher.

CHAPTER II

THEORETICAL DESCRIPTION, FRAMEWORK, AND THE HYPHOTESIS

A. Theoretical Description

1. Puzzle Media

a. The Concept of Puzzle Media

Puzzle is one of the effective media that can be used by teacher as an effort to improve studes' vocabulary mastery, cause puzzle constitute of random letters that will be arranged to be a word. So, students will have the good motivation to arrange it quickly and exactly.[1] This media can be used in learning process.

Puzzle is one of media that can increase students' understanding to the lesson subjectand also can practice their reasonable. Collins Cobuild says "Puzzle is question, game, or toy which you have to think about carefully in order to answer it correctly or putit together properly".[2] By using this puzzle students can get experiences directly in learning, cause they etangle and doing the learning directly. So, it can help students increase their understanding.

Puzzle can increase students' memory and fun. Wojowasito and Poerwadamanita say, "Puzzle adalah teka teki berupa gambar yang

[1]Henry Guntur Tarigan, *Metodologi Pengajaran Bahasa,* (Jakarta: Angkasa) 1986, p. 122

[2]Collins Cobuild, *New Students' Dictionary,* Second Edition (Glasgow: Harper Collins Publisher, 2002) p. 559

dapat merangsang anak untuk berpikir".[3] Puzzle can use as a fun teaching media without lost essence in studying process. It also can make students' brain higher and increase their memory.

Puzzle is a media that can support learning process. Kendall and Spoerer say, "Word games and puzzle are spoken or board games often designed to test ability with language or to explore its properties".[4] Puzzle can use to engage students' participation in learning the material. Because, this media will be done by the students directly.

Puzzle can be a media game that face the students' creativity trick and memory more deepest, because motivation appears to solve the problem, but it still fun although do it continuously. Challenge in this game will always make the students to do it more. Try to do it until have a good success.

Discussed about media, Wilbur Scram defined "media dapat membantu mencapai sasaran pengajaran". Its mean that media can use to get the goal in learning process. The use of media is important to arouse the intrinsic motivations of the learners.

While David says that " Media is something we use when we want to communicate with people indirectly, rather than in person or by

[3]Wojowasito and Poerwadamanita, *KamusBahasa Indonesia Inggris*(1980) p. 165

[4]Kendall G Parkess and Spoerer K, *A Survey of NP-Complete Puzzles*, International Computer Games Association Journal, 31(1), pp 13–34

face to face in contact".[5] Media needs when we want to communicate to another people, it can be a tool of communication.

Kasim says that media is the kind of equipments that are used by the teacher to help him in teaching his students.[6] Teacher needs media in teaching process as a tool to make the students easier in understanding the matter. Every matter or lesson has a good or exact media in using. But, the important is how the media can be effective to use.

Puzzle media can creat creativities, fun, and don't feel boring, and also practice students' think logically, improve students' ideas, help them to undestand something easily and quickly.

The conclusion was puzzle is kinds of media that can support students in learning. Which is this media can be a tool is used to increase students' cognitive skill and memory. So, the good memory will give the good effect to students' studying result. Besides can increase students' cognitive skill, it also easier and simple than another media.

By using this puzzle media, students get the experiences directly in learning process, cause students do it by themselves. So, it can improve their understanding more quickly.

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[5]David Buckingham, *Children and Media: A Cultural Studies Approach*,(MIT Press)2008, p. 3

[6]Muhammad Kasim, *Mahir Berbahasa Indonesia, (*Ganaco:Grafindo Prasada Rao) 1956, p. 132

b. Kinds of Puzzle

There are some kinds of Puzzle that can use in teaching vocabulary, they are:

1) *Spelling puzzle*, yakni *puzzle* yang terdiri dari gambar-gambar dan huruf-huruf acak untuk dijodohkan menjadi kosakata yang benar.
2) *Jigsaw puzzle*, yakni *puzzle* yang berupa beberapa pertanyaan untuk dijawab kemudian dari jawaban itu diambil huruf-huruf pertama untuk dirangkai menjadi sebuah kata yang merupakan jawaban pertanyaan yang paling akhir.
3) *The thing puzzle*, yakni *puzzle* yang berupa deskripsi kalimat-kalimat yang berhubungan dengan gambar-gambar benda untuk dijodohkan.
4) *The letter(s) readiness puzzle*, yakni *puzzle* yang berupa gambar-gambar disertai dengan huruf-huruf nama gambar tersebut, tetapi huruf itu belum lengkap.
5) *Crosswords puzzle*, yakni *puzzle* yang berupa pertanyaan-pertanyaan yang harus dijawab dengan cara memasukan jawaban tersebut ke dalam kotak-kotak yang tersedia baik secara horizontal maupun vertikal.[7]

From the five kinds of puzzle above, the researcher only focuses on spelling puzzle. Spelling puzzle in this case is the researcher disordered the letters of word, then the students arrange it to be a word that the researcher determine before.

c. Advantages and disadvantages of Puzzle

There are some advantages of puzzle for students, they are:

1) Improve cognitive skills

Cognitive skill related to the ability in learn and solving problems. Puzzle is a game that appeals to children because children are basically like the form of drawings and attractive colors. This

[7]Jill Hadfield, *Intermediate Vocabulary Games*,England: Longman Ltd, 2004, p. 30

course will be associated with an increased ability to learn and solve problems. Interact and discuss very likely to occur when the child tried to solve his puzzle.

2) Improve soft motor skills

Soft motor skills associated with the child's ability to use his muscles, particularly the hands and fingers. Infants, especially children aged less than 3 years recommended many get exercise fine motor skills. By playing puzzle without realizing the child will learn to actively use his fingers.[8]

3) Improve social skill

Social skills associated with the ability to interact with others. Puzzles can be played individually. However, the puzzle also can be played in group. The game is done in group of children will increase the social interaction. The group of children will respect each other, help each other and discuss with each other. If children play puzzle at home parents can accompany the child to discuss completing the puzzle, but preferably, the parents only give guidance to the child and not actively involved helping children make up the puzzle.

4) Train hand-eye coordination

Children learn arrangingto keep pieces of the puzzle and put them into one image. This is an important step towards the development of reading skills.

[8]Mayke S. Tedjasaputra,.*Bermain,Mainan Dan Permainan,* (Jakarta: Grasindo, 2010) p. 40

5) Train of logic

Help train the child logic. Eg human pictorial puzzle. Children are trained to conclude where lies the head hands and feet corresponding logic.

6) Exercisepatience

Playing puzzle needs perseverance, patience, and take time to think in completing the challenge.[9]

7) Expanding knowledge

Children will learn a lot of things, colors, shapes, numbers, letters. The knowledge gained from this method usually memorable for children than memorized. Children can learn the basic concepts, animals, natural surroundings, fruit, alphabet and others. Of course, with the helping of mom and dad.

Despite of advantages of puzzle, it also has disadvantages. The disadvantages are contrary with the advantages above.

d. Steps of Puzzle

There are some steps of making spelling puzzle, they are:
1) Writing each word on paper
2) Cutting the word to be a letter
3) Dividing the puzzle to the students, while for individualism or group
4) Limit the time to arrange the puzzle to be a word.[10]

[9]A. Suciaty Al-Aziz, *Ragam Latihan Khusus Asah Ketajaman Otak Anak Plus Melejitkan DayaIngatnya* (Yogyakarta: Mitra Media, 2010) p. 78-80

[10]Scram, article, http://www.wikihow.com/Make-a-Puzzle, Accessed on 22 December 2015, at 08.34 pm

Steps of puzzle above are used when the learning process is running. A teacher must make the learning process is running systematic. So, the learning process will run as well as teacher hopes.

e. Principles of Puzzle Design

There are ten principles for mking a good puzzle, they are

1) To make the goal of puzzle easy to understand, to get people interested in the puzzle at the outset.
2) To make it easy to get started. If the puzzle is too hard to solve, people will begin to either a trial and error approach.
3) To give the player a sense of progress.
4) Giving the puzzle a sense of solvability.
5) Increasing the difficulty gradually.
6) Having parallelism to get the player rest.
7) Having pyramid structure to extend the level of interest and this is something parallelism leads to.
8) Have to hint in order to extend the level of interest.
9) Giving the answer.
10) Perceptual shift. It means a shape or word what can look like different things depending on how you look at it, almost like an optical illusion.[11]

From the ten principles of puzzle above, must be have by the teacher in designing the puzzle. The puzzle will be good by those principles above.

2. Vocabulary Mastery

a. Definition of Vocabulary Mastery

Vocabulary is one aspect that should be owned by every student to make them understand and master English language. Mastering vocabulary is very important to support students in learning

[11] Rabi Afram, Puzzle Design in Adventure Games, https://www.diva-portal.org/smash/get/diva2:629026/FULLTEXT01.pdf, Accessed on 21 December 2015, at 14.22 pm

English.Considering that English language consists of skills that have mutual affect to the achievement of vocabulary. Howard Jackson says "Vocabulary is a representative collection of the words that exist in English language".[12] It means that vocabulary is a collection of English words or it can be another language that has a part and make that collection be easier to find out.

Another statement about vocabulary is said by A.S Hornby "the total numbers of words with rules combining them which make up a language are called vocabulary".[13]Then, Shirley Burridge says "Vocabulary is all the words in language, list of word in a lesson or books, all the words that one person knows".[14] Next, Thomas Nelson considered that "Vocabulary is a list of word explained in alphabetical order".[15]While, Martin H Manser says, "Vocabulary is total number of words in a language, words known to a person, list of words with their meaning".[16]When new vocabulary is being introduced and practiced, there is a good opportunity for the general revision of structure and

[12] Howard Jackson, *Words, Meaning, and Vocabulary,* (London: Casel, 2000), p.118

[13] A.S Hornby, *Oxford Advanced Learner's dictionary* (Walton Street: Oxford University Press, 1995). p. 59

[14] Shirley Burnidge, *Oxford Basic English Dictionary*, (New York: Oxford University Press, 1981), p. 477.

[15] Thomas Nelson, *The Award Compact English Dictionary,* (London: Award Publication, 1985), p. 612.

[16] Martin H Manser, *Oxford Learner's Pocket Dictionary,* (Oxford University Press, 1995), p. 1506

pronunciation.[17] From all of the statements, the researcher concluded that vocabulary is a list of word in a language that has a part and make that collection be easier to find out

Mastery comes from the word “master”. Master is a person that has skill and able in some work, profession, science, etc. while “mastery is the expert skill or knowledge”.[18]Thomas Nelson says “ Mastery is the power or authority at a master, power to understand or skills to manage”.[19] Hornby says on Oxford Advanced Learner’s Dictionary “Mastery is a complete or the state of having control over something superiority in competition, victory eminent skills or through knowledge”.[20] While in Indonesian dictionary“Mastery is a comprehension or capability to use knowledge or skill”.[21] It means students must master English vocabulary and its grammatical rules to support them in learning English well or to master the English language.

Based on the definitions above, the researcherconcludesthat vocabulary mastery is the ability to understand the list of words. It means that the students have ability in understanding and using the list

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[17] John Haycraft, *An Introduction to English Language Teaching* (Longman Group Limited, 1978), p. 50.

[18] A S Hornby, *Oxford Advanced Learner’s...* p. 833

[19]Thomas Nelson, *The Award Compact English...* p. 421

[20] A S Hornby, *Oxford Advanced Learner’s...* p. 20

[21] Tim PenyusunKamusPusatPembinaandanPengembanganBahasa, *KamusBesarBahasa Indonesia,* (Jakarta: BalaiPustaka, 2001), p. 1077

of word and also the meaning. It also plays the important part in English skills; listening, reading, speaking, and writing. The large vocabulary, the students will find many difficulties in mastering English skills.

b. Kinds of Vocabulary

Vocabulary is an important part in learning English, because it is related to other English skills, without having vocabularies someone can not learning English well. According to Thornbury in Harmer, there are two kinds of vocabulary as follows: Receptive vocabulary or passive vocabulary and productive vocabulary or active vocabulary.[22]The further explanation, are:

1. Receptive vocabulary or passive vocabulary

   Receptive vocabulary can be understood only through listening and reading. Someone doesn't need to know much about the receptive vocabulary because someone rarely uses the receptive vocabulary and it is impossible for someone to memorize all the vocabularies of a certain language but someone can understand the ideas of the utterance contextually not word by word.

2. Productive vocabulary or active vocabulary

[22] Jeremy Harmer, *The Practical of English Language Teaching*, (New York: Longman, 2000), p. 158

Productive vocabulary involves of knowing how to pronounce the word, how to write and spell it, how to use it in correct grammatical patterns along with the words that usually collocate with.[23] It's the important in vocabulary. It includes all of the part of a word, such the pronunciation, spelling, and the grammar.

Additionally, there are four kinds of vocabulary, they are:

1) Reading vocabulary
   A person's reading vocabulary is all words he or she can recognize when reading. This is largest of vocabulary simple because it includes to other three.
2) Listening vocabulary
   A person's listening vocabulary is all the words he or she can recognize when listening to speeds. This vocabulary is aided in size by context and tone of voice.
3) Writing vocabulary
   A person's writing vocabulary is all the words he or she can recognize it in writing.Contrary to the previous of two vocabulary types. The writing vocabulary is stimulated by its user.
4) Speaking vocabulary
   A person's speaking vocabulary is all the words he or she can use in speech. Due to the spontaneous nature of the speaking vocabulary, words are often misused. This misused-thought slight and unintentional-may be compensated by facial expression, tone of voice or hand gesture.[24]

Vocabulary varies in the four skills of language. Generally, students will absorb listening and speaking vocabulary before coming

[23]*Ibid*., p. 159.

[24]Murry H, http://www.srsdeaf.org/Downloads/Bridge_of_Vocabulary.pdf Accessed on 09 July 2015 at 11.59 pm

to the reading and writing vocabulary. But in real situation, the process may change, especially in foreign language teaching.

c. Classification of Vocabulary

Vocabularies are classified into function of words and contents. The classification of word intended of such as nouns, pronouns, verbs, adjectives, prepositions, conjunctions, and interjections, in classsification the words, categorized them as follows:

1) Adjective is the word is used to add the meaning of noun.
2) Adverb is the word is used to add something to the meaning of a verb, and adjectives, or another adverb.
3) Preposition is the word is used with a noun or pronoun to show how the person or thing denoted by the noun or pronoun stands in relation to something else.
4) Pronoun is the word is used instead of a noun.
5) Verb is the word is used to say the working of the person or thing.
6) Noun is the word is used as the name of a person, place, or thing.
7) Conjunction is the word is used to join words or sentence.
8) Interjection is the word is which express some sudden feeling.[25]

Based on the classification above, so the writer will focus on noun:

1) Definition of Noun

Martin says, "Noun is a word used as the name a person,place, and thing.[26] Then, Marcella Frank says "Noun is one of the most important part of speech. It is arrangement with the

[25] Martin, *High School English Grammar,* (Jakarta: PrasadaRao, 1990), p. 3
[26] *Ibid,* p. 4

verb help to farm the sentences. In addition it may function as the head word in many structure."[27] According to Jayanti Dakhsina Murty, she says that "Noun is a word is used to name a person, place, thing, and idea or quality of mind is defined a noun."[28]

And the other statement about definition of noun that, noun is naming things that we cannot count (uncountable or mass nouns) have no indefinite article, and usually no plural.[29] Collins in Cobuild English Grammar says that "noun is used to identify a person or thing."[30]

From the statements above, the researcher concluded that noun is a word that is used to name a of things, such as person, place, and it may can be counted or not.

2) Kinds of Noun

In English grammar, noun can be observated into some possibilities[31], they are:

a) According to the form, noun divided into two kinds, they are:

1)) Concrete noun

Concrete noun is the name of a thing that can be touched or seen. Its' divided into four kinds:

a)) Common noun. It is the name is given to every person or thing of the same class or kind. Examples: teacher, lecturer, lawyer, boy, girl, car, tree, etc.

b))Proper noun. It is the name of some particular person, place, country, school, day, month, religion,

[27] Marcella Frank, *Modern English*, (New York: Prentice Hall, 1972), p. 47

[28]JayanthiDakhsinaMurty, *Contemporary English Grammar*, (New Delhi: Rames Nagar, 1990), p. 5

[29]Stannard Allen, *Living English Structure*, (Hongkong: Longman, 1987), p. 1

[30] Collins, *Cobuild English Grammar,* (Cheltenham Promerade Graphics, 2003), p. 5

[31]Rudi Haryono, *Complete English Grammar,* (Surabaya: Gitamedia Press, 2002) p. 13 - 39

and nationalism. Example: Indonesia, State Institute of Islamic Studies, Airlangga, December, Friday, Islam, Computer Acer, Padangsidimpuan, etc.

c)) Collective noun. It is the name of collection of things or persons that can be counted. Examples: committe, team, class, family, class, fleet, etc.

d)) Material noun. It is the name of a material or substance out of which things are made. Example: gold, wood, milk, air, tea, butter, water, paper.[32]

2)) Abstract noun

Abstract noun is a noun that has no form, can't be counted and touch by . Example: love, goodness, freedom, truth, life, etc.

b)) According to totalling, noun divided into two kinds, they are:

1)) Singular noun

Singular noun is a noun that is demonstrated the thing is one or only one. Commonly, singular noun is always begun by article a or an, especially for the thing that can be counted. Examples: book, college, university, library, building, banana, etc.

2)) Plural noun

Plural noun is a noun that is used to demonstrate the thing is more than one. Commonly, plural noun is always added by s or es in the end. Examples: schools, universities, students, teachers, classes,mottoes, etc.

c)) According togender, noun divided into four kinds, they are:

1)) Masculine gender

Masculine gender is a noun that is used to demonstrate the men or male. Examples: father, brother, uncle, husband, boyfriend, boy, king, boar, drone, ram, etc.

2)) Feminine gender

Feminine gender is a noun that is used to demonstrate the women or female. Examples: mother, sister, aunt, wife, girl, ewe, bee, hen, girlfriend, etc.

3)) Common gender

Common gender is a noun that can be men or women, or male or female. Examples: student, collegian, adult, teacher, lecturer, secretary, friend, baby, children, etc.

4)) Neuter gender

[32]JayanthiDakshina Murthy, *Op. Cit.,* p. 10-11

Neuter gender is a noun that has no gender or netral and only used for thing that has no soul. Examples: bag, box, chair, table, chalk, door, window, etc.

d)) According to case, noun divided into three kinds, they are:Nominative case, Possesive case, and Objective case. Case is the way how to put the noun in the sentence, even as subject, object, and complement.

e)) According to calculating manner, noun can be divided into two kinds, they are:

1)) Countable noun

Countable Noun is the name of a thing that can be counted or divided into singular or plural.Countable noun is a noun that is can be counting by total number.[33]A countable noun is a word that refers to a person or thing andhas a singular and plural form.[34] Countable noun also includes with common noun and collective noun.

There are some characteristics of countable noun[35], they are:

a. Can change to plural form.
   Example: - There is a pen on the table
   - There are two pens on the table
b. Can combine with articles *a*, *an* and *the*, even in singular or plural.
   Example: - There is *a* man in the room
   - I bought *an* umbrella last week
   - *The* son of my teacher is a lawyer
c. Can combine with *some*, and *any* in plural form.
   Examples: - I need *some* chairs

[33] Windy Novia, *Basic English Grammar*… p. 24

[34]Selly, J, *Oxford A-Z of Grammar and Punctuation,* (Oxford: Oxford University Press), 2009, p. 200

[35] Rudi Haryono, *Complete English Grammar* . . . p. 20-21

- Do you have *any* money?

d. Can combine with *all of, none of, both of,* and *few,* but only in plural form.
   Examples: - *All of the pens* in my desk are red
e. Can combine with *many, a lot of, several,* and *a great,* but only in plural form.
   Examples: - She doesn't have *many books.*
f. If the countable in singular form, the verb also must be singular, by adding *s/es*in the verb, or must follow by *is* or *was.*

Examples: - My lecturer*stands* near the door

g. If the countable in plural form, the verb also must be plural without adding *s/es*, but must follow by *are* or *were.*

Examples: - Our *books are* on the table

2)) Uncountable noun

Uncountable noun is a noun that can't be counted by total number.[36]An uncountable noun is a word that refers to a body or mass of something.[37]Uncountable also includes with material noun and abstract noun.

Uncountable noun includes[38], they are:

a) Nouns naming intangible things which normally cannot be counted. Eg: honest, information, etc.
b) Nouns naming tangible things which are thaught of as subtance. Eg: butter, milk, sand, etc.
c) Nouns naming groups of things which in English are referred to collectively. Eg: furniture, news, etc.
d) Names of language. Eg: English, Spanish, etc.

There are some characteristics of uncountable noun, they are:

a. Always in plural form, never be singular.

[36]*Ibid.*, p. 26
[37]Selly, J, *Oxford A-Z of Grammar and Punctuation . . .*, p. 206
[38]Mary Ansell, Free English Grammar , p. 211-212 http://kisi.deu.edu.tr/binnur.kavlak/ingilizce/belgeler/FreeEnglishGrammar.pdf Accessed on 30 October, 2015 at 10.59 pm.

Examples: - We can write letters on the *paper*

b. Cannot combine with article *a* and*an.* But, can combine with article *the* in singular meaning.

Examples: - *Milks* come from a cow

-*The fruit* is good for healthy

c. Can combine with *some* and *any,* but it means *little.*

Examples: - She wants *some water*

d. Can combine with *much, a lot of, a great deal of* or *plenty of*, but it means*much.*

Examples: - Does he have much *sugar?*

e. Always follow by singular verb, by adding *s/es*in the verb or follow by *is* or *was.*

Examples: - There *is a lot of money* in my wallet

-The cheese *makes* from *milk*

From the five kinds of noun above, the researcher only focus on two kinds, countable and uncountable noun.Countable noun is the name of a thing that can be counted or divided into singular and plural and it names anything (anyone) that can be counted. While uncountable noun, is the name of a thing that can't be counted or divided into singular and plural. It meansuncountable noun is a noun which does have a plural form, and which refers to something that can't be counted.

d. Teaching Vocabulary

Teaching is seen as an activity one tries to help and to lead someone in getting, changing, or developing skills, attitude, ideas, appreciation and knowlwdge. It support by Hornby that teaching is to give instruction to somebody, or cause somebody to know or be able to do something, give to somebody knowledge, skill and give lesson at

school.[39] Moreover, teaching as defined in terms of educational objectives is the process of delivering material from teachers to students, and as result, there will be a changing habit in the students' behavior.

David Nunan says, "Teaching vocabulary is very important part of language learning and one of the difficulties in planning the vocabulary components of a course is making sure that does not overwhelm other essential pat of the course."[40] The first point to making connection in teaching vocabulary is one that most teachers take for granted today. The techniques suggested here are for selective and appropriate use when such situation arise not teaching lists of words. When teaching a word, the teacher must teach three things, they are:

1. The teacher must teach the shape, form of the word
2. The teacher must teach the meaning of the word
3. The teacher must teach that the form and the meaning of the word go together.

Based on the definition above, the researcher concluded that teaching vocabulary is a process of delivering the vocabularies to students in which, in the process can use a technique to make it easy in running.

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[39] A. S Hornby, *Oxford Advanced Learner's...* p. 886

[40] David Nunan, *Practical English Language Teaching, First Edition,* (America: New York, 2003), p. 135

e. Principles of Teaching Vocabulary

Vocabulary is one of the language elements that should be mastered by students and also has difficulties in teaching planning. The best way to avoid this is for the teacher and course designer to have a set of guiding principles that can be applied in a variety of teaching and learning situations. They are:[41]

1) Focus on the most useful vocabulary first

The most useful vocabulary that every English language learner needs whether they use the language for listening, speaking, reading, or writing, or whether they use the language in formal and informal situation, is the most frequent 1000 word families of English. This vocabulary is so useful that it covers around 75 percent of the running words in academic texts and newspaper, over 80 percent of the running words in novels, and about 85 percent of the running words in conversation. It contains most of the 176 function word families (word like a, the, of, because, could) and words like keep, kind, know, lack, and land. It is possible to say and write a lot using only the first 1000 words of English.

2) Focus on the vocabulary in the most appropriate way

There are four most important vocabulary learning strategies, they are using word parts, guessing from context, using word cards, and

[41] David Nunan, *Language Teaching Methodology,* (London: Longman, 2000), p. 117

using dictionaries. Using word cards is one of the appropriate strategies for children to help them memorize the new words.

3) Give attention to the high frequency words across the four strands of a course

   High frequency vocabulary needs to occur in all four strands of course. It should get deliberate attention through teaching and study and should be met and used in communicating messages in listening, speaking, reading, and writing. High frequency vocabulary should also be fluently accessible for receptive and productive use.

4) Encourage learners to reflect on and take responsibility for learning

   There is an important principle that lies behind choosing and learning are that is that learners need to realize that they must be responsible for their own learning. Taking this responsibility requires:

   a) Knowledge of what to learn and the range of options for learning vocabulary
   b) Skill in choosing the best options
   c) The ability to monitor and evaluate progress with those options

This principle must be understood by the teachers, in line with the strategy or media that they use.

3. Media in Teaching Vocabulary

Teaching vocabulary plays an important role in language acquisition because the mastery of vocabulary will help students to master all the language skills; speaking, listening, writing, and reading. The vocabulary will make the students practice life and strengthen belief that English can be used to express the same ideas or feeling they express in their native language.

Wallace says, there some factors that should consider in teaching vocabulary[42], they are:

a) Aims. It means the aims of teaching vocabulary is to make the teacher easy to formulate the materials, which will be taught to the students.
b) Quantity. The learners will get confuse if they get many new words. Therefore, the teacher should select new words, which can easy to undersatnd by the learners.
c) Need. In teaching vocabulary, the teacher has to choose the words really needs by the students in communication.
d) Frequentexposure and repetition. It means the teachers should give much practice on repetition so that the students master the target words well. They also give opportunity ti the students to use words in speking and writing.
e) Meaningful presentation. In teaching vocabulary the teacher should present target words in such a way that the meaning of the target words are perfectly clear and unambiguous.
f) Situation and presentation. The teacher tells the students that they have to use the words appropriately. The use of words depends on the situation in which they are used are depends on the person to whom they are speaking.

From the explanation above, the researcher concludes, that the teacher must know the different kinds of vocabulary and all of the factors in teaching vocabulary to the learners.

[42] Wallace, 1982, p. 207

Teaching media will influence the teaching learning process, which can be facilitated the teaching methods as the tools to deliver the 18 lessons. Arsyad divides teaching media into three categories[43], they are:

a) Visual Media

Visual media is also called as printing media. Visual media is all kind of media that can be seen or touch by the students. The examples of visual media are; pictures, photos, real things, charts, miniatures, cards. Moreover, the characteristics of visual media are; text is read in visual manner, in other hand visual is exceeded based on the room, text and visual show one way communication and receptive, text and visual is shown in tactically, in developing this media depend on the language principle and visual perception, it's oriented to the students, and the information can be rearrange by the user.

b) Audio Media

Audio media is also called by the listening media. It is usually used to listen and understand the passage. The characteristics of this media is that they show one way communication. The kinds of audio media, such as: radio, tape recorder, cassette, and compact disc.

c) Audio Visual Media

Audio visual media is media that audible and visible. Audible means can be heard, and visible is can be seen. Audio visual media has

[43]Azhar Arsyad, *Media Pembelajaran*, (Rajawali Pers), 2009, p. 31

more benefits than others, such as it can visualize the abstract things or non verbal vocabularies, to overcome the limitation of place and time, to overcome the limitation of people sense, to attract students attention, and developes students' knowledge. The audio visual media needs mechanic and electronic machines to show the audio and visual message. There are some characteristics of audio visual media; linierity, show dynamic visual, can be implemented by using the ways which stated by the maker, as physical representation of real or abstract ideas, it was developed based on behaviorism phycholgy and cognitive principle, teacher oriented through the low students' interactive involve level. The kinds of audio visual media are: video, movie, television, and LCD projector.

According to explanation above, the researcher classified media in teaching vocabulary, they are: song, picture, movie, puzzle, flashcard, blackboard, and all of categorized as kinds of media in teaching. In this thesis, the researcher chose puzzle as her media in the research.

B. Review of Related Findings

Talking about related findings, the researcher found some researches have done by the person. First, Dewi Fitria Azizah's script "Improving Students' Ability in Mastering Vocabulary Through Puzzles and Riddle Game at the Seventh Grade Students of MTs Darul Huda Mayak Tonatan Ponorogo in Academic Year 2010/2011". The aim of the researh is to know can puzzle

and riddle game improvestudents' vocabulary. The research conducted by classroom action research. The result of the collecting data waspuzzle and riddle game can improve students' vocabulary mastery.[44]

Second, Rosi Rosita script's "Teaching english by Using Puzzle to Improve Students' Vocabulary Mastery (an Experimental Study on the Fifth Grade Students at SDN Tanjunglaya III". The aim of the research is to find out the effect of puzzle on students' vocabulary mastery. The research was conducted by experimental method. The result of the collecting data is there was a significant effect of puzzle on students' vocabulary mastery on fifth gradeof SDNTanjunglaya III.[45]

The last, Muadib Mahasin's script "An Experimental Study of The Use of Puzzle Game to Improve Vocabulary Mastery of the Third Years Students of MI Maa'rif Tingkir Lor Salatiga in the Academic Year of 2010/2011". The aim of the research is to find out the effect of puzle game on students' vocabulary mastery. The research was experimental research. The

[44]Dewi Fitria Azizah, Improving Students' Ability in Mastering Vocabulary Through Puzzles and Riddle Game at the Seventh Grade Students of MTs Darul Huda MayakTonatanPonorogohttp://digilib.stainponorogo.ac.id/gdl.php?mod=browse&op=read&id=stainpress-11111-dewifitria-751, Accessed on 21 December 2015, at 12.52 pm

[45]Rosi Rosita, Teaching English by Using Puzzle To Imrpove Students' Vocabulary Mastery, http://publikasi.stkipsiliwangi.ac.id/files/2012/10/08220103-rosi-rosita.pdf, Accessed on 21 December 2015 at 10.31 pm

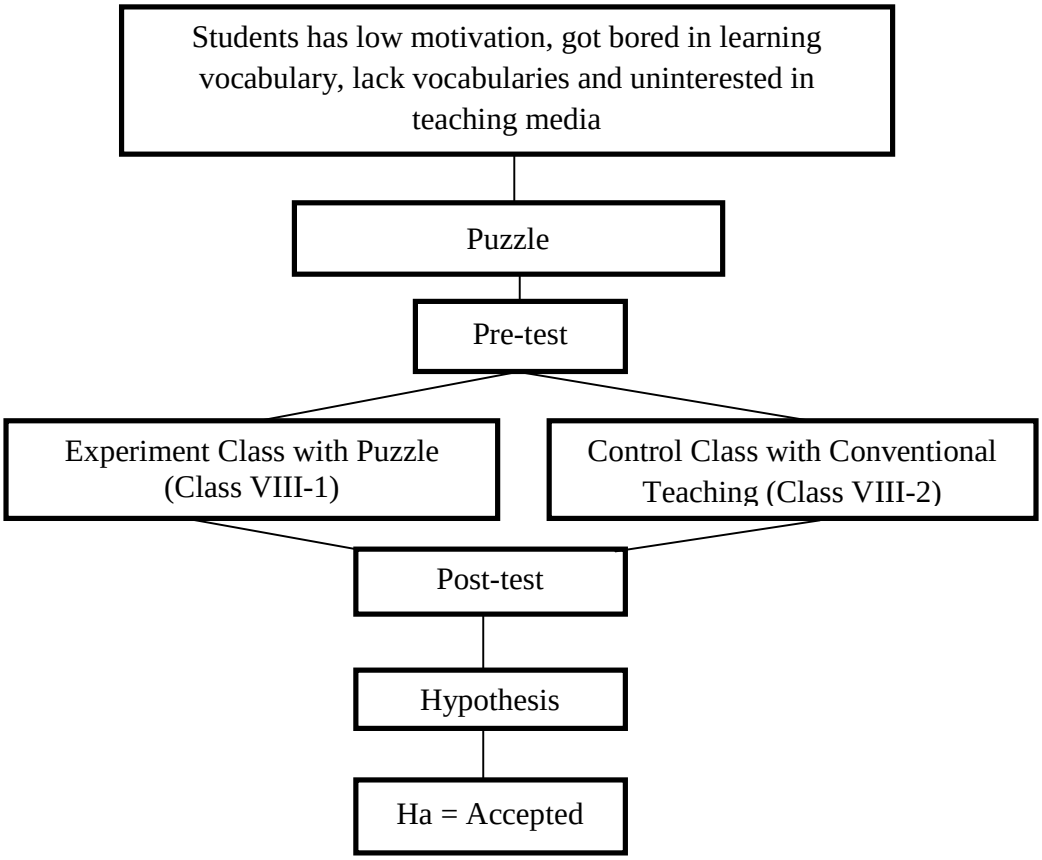
result of the collecting data there was significant effect of puzzle to students' vocabulary mastery on third year of MIMaa'rif Tingkir Lor Salatiga.[46]

The three researches above have similarity with the researcher's title. The aim of this research was to find out the effect of puzzle on students' vocabulary mastery. This research would be conducted by experimental research.

C. Conceptual Framework

The successful of vocabulary mastery depend on many factors. One of them was how the teacher taught vocabulary to the students. The suitable method is very important to teach vocabulary. So, the students' must have a good media in learning vocabulary. Vocabulary strategy is the strategy that used while the students memorize the vocabulary. So, they can more easily to memorize and remember the new words. Puzzle is a media in teaching vocabulary. It can make the students relax and enjoy when studying vocabulary. The relation of puzzle on vocabulary mastery can be seen as the diagram below:

[46]Muadib Mahasin, An Experimental Study of the Use of Puzzle Game on Students' Vocabulary Mastery, http://www.distrodoc.com/174759-an-experimental-study-of-the-use-of-puzzle-game-to-improve , Accessed on 21 December 2015, at 11.57 pm



D. Hypothesis

Suharsimi says Hypothesis is a tentative answer that is needs to be the answer of the problem.[47] It means, hypothesis is an interim assessment about a research that will be proven the truth by collecting the data. The hypothesis of this research was stated that" Puzzle media has significant effect on developing students' vocabulary at eighth grade of MTs N 2 Padangsidimpuan".

[47]Suharsimi Arikunto, *Manajemen Penelitian,* (Jakarta: Rineka Cipta, 2009), p. 55

CHAPTER III

RESEARCH METODOLOGY

A. Research Design

The kinds of this research was quantitative design in experimental research form by using one group pre-test – post-test control group design. L.R Gay says "Experimental research is the only one type of research that can test hypotheses to establish cause and effect."[1] According to John W. Creswell, "Experimental research include true experiment with the random assignment of subject to treatment condition as well as quasi experiment that use non randomized."[2] From the statements, the researcher concluded that the experimental research is a kind of the research which has aim to know the causal effect relationship between two or more variables.

B. Place and Time of Research

This research has been done in MTs N 2 Padangsidimpuan. The population of this research was at the eighth grade students of MTs N 2 Padangsidimpuan 2015-2016 Academic years. This research has been done from 20 May to 14 December 2015. So that, this research has been done about eight months.

[1] L.R Gay and Peter Airasian, *Educational Research,* (New Jersey: Merril, 2000), p. 367
[2] John W. Creswell, *Research Design,* (USA: Sage Publication, 2002), p. 14

C. Population and Sample

a. Population

Population is a group of the studying result of the reseach. L. R. Gay and Peter Airisian say "Population is the group of interest to the researcher, the group into which she or he would like the result of the study to be generalizable."[3] While, Suharsimi Arikunto says "population adalah seluruh subjek dalam penenlitian."[4] A population is a set (collection) of all elements prosessing one or more attributes of interest. Based on the quotation above, the researcher done the research at the eighth grade of MTs N 2 Padangsidimpuan. the population was can be seen from the table below:

Table 1.
Population of class

No	Class	Total Population
1	VIII-1	37 Students
2	VIII-2	36 Students
3	VIII-3	35 Students
4	VIII-4	37 Students
Total Population		145 Students

[3] L. R. Gay and Peter Airisian, *Educational Research*… p. 122
[4] Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan Praktik, Edisi Revis*i (Jakarta: Rineka Cipta, 2010) p. 173

The researcher done the research by using puzzle to know the effect of puzzle on students' vocabulary mastery at eighth grade of MTs N 2 Padangsidimpuan.

b. Sample

Sample is a part of population. Suharsimi Arikunto states "Sample is part of population that will be done by research."[5] So, Sample is the part of population that is chosen as respondent of the research.

Here, the researcher was taken the sample by using random sampling technique. The tricks to use random sampling are using a lottery, ordinal, random number table or computer. So, the researcher has decided two classes as a sample. One class as an experimental class, and one for control class. The researcher chooses class VIII-1 as experimental class and class VIII-2 as control class. The class VIII-1 consists of 37 students and class VIII-2 consists of 36 students. Therefore, total sample is 73 students. Before using random sampling, the writer used normality and homogeneity test, they are:[6]

1. Normality test

   The function of normality test is to know whether the data of the research is normal or not. The research is normal or not. The

[5] *Ibid*, p. 174
[6] Mardalis, Metode Penelitian: Suatu Pendekatan Proposal (Jakarta: Bumi Aksara, 2003) p. 85

researcher used normality test with using *Chi-Quadrate* formula, as follow:[7]

$$x^2 = \sum \left(\frac{f_o - f_h}{f_h} \right)$$

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 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 normal.

2. 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 function of

[7] Anas Sudijono, *Pengantar Statistik Pendidikan*. (Jakarta: PT. Raja Grafindo Persada. 2005), p. 298.

homogeneity test is to find out whether the data was homogeneity or not. It use Harley test, as follow:[8]

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

Hypotheses is accepted if $F_{(count)} \leq F_{(table)}$

Hypotheses is rejected if $F_{(count)} \geq F_{(table)}$

Hypothesis is rejected if $F \leq F\frac{1}{2}\ a(n_1.1)$ (1= n_2-1), while if $F_{count} > F_{table}$ hypothesis is accepted. It determined with significant level 5% (0, 05) and dk numerator was (n_1-1), while dk detominators is (n_2-1).

Based on explanation above, the population was the four classes, two classes are selected randomly in order to be an experimental and control class. In this research, the experimental class is VIII-1 and control class is VIII-2. The researcher chosen VIII-1 consists of 37 students and VIII-2 consists of 36 students. Therefore, total samples are 73 students.

After comparing the normality and homogeneity test of the four classes in pre-test, the researcher found that all the classes are homogenous and the normal classes are VIII-1, VIII-2, and VIII-3 is not normal. So, the researcher concluded that VIII-1 and VIII-2 are

[8] Agus Irianto, *Statistik Konsep Dasar dan Aplikasinya*. (Padang: P2LPTK Departemen Pendidikan Nasional, 2003), p. 276.

the sample of this research. The researcher chosen these classes because they have similar competence based on their result in pre-test. In this research, the experimental class is VIII-1 and control class is VIII-2. The researcher chosen VIII-1 consists of 37 students and VIII-2 consists of 36 students. It sample can be seen from the table below:

Table II.
Classification of Sample

Experimental Class (VIII-1)	Control Class (VIII-2)
37 Students	36 Students

D. Instrumentation of Collecting Data

Instrument is must be have by a researcher, because a good instrument can take the validity of the data. Instrument is tool is used by researcher when do the research by a method.[9] The result of the research was valid and reliable if in collecting the data the researcher must use a validity and reliability instrument. So that, a researcher must have a good instrument to make the task more easier, better, complete and systematic in getting the data.

In this research, the researcher used test as instrument. Test is some questions or exercises that is used to measure skill, knowledge, ability, and competence even by group or individualist. From the result of analysis for 50

[9] Suharsimi Arikunto, *Prosedur Penelitian Suatu* ... p. 192

instrument tests, in which 25 for pre-test and 25 for post-test. The researcher concluded that for pre-test only 20 were categorized valid and 5 were categorized invalid (see appendix 8). Then, for post-test also consisted of 20 items were categorized valid and 5 were categorized in valid (see appendix 11). The calculation of how to get it could be seen in the appendix 7 & 10. So, the researcher conducted 20 items for experimental class and 20 items for control class. The researcher was given the pre-test and post-test to experimental and control class. It can be seen from the table below:

Table III.
The indicators of Vocabulary mastery in Pre-Test

NO	Indicators	Items	Number of Items	Score	Total Score
1	Countable Noun	10	1, 2, 3, 5, 7, 8, 11, 12, 13, 19	5	50
2	Uncountable Noun	10	4, 6, 9, 10, 14, 15, 16, 17, 18, 20	5	50
Total		20			100

Table IV.
The indicators of Vocabulary mastery in Post-Test

NO	Indicators	Items	Number of Items	Score	Total Score
1	Countable Noun	10	1, 3, 6, 8, 10, 11, 12, 18, 19, 20	5	50
2	Uncountable Noun	10	2, 4, 5, 7, 9, 13, 14, 15, 16, 17	5	50
Total		20			100

E. Validity and Reliability Instrument

a. Validity

Validity is a measurement that is used to indicate the level of validity test.[10] A validity instrument has high validity. The opposite, a less validity instrument has low validity. An instrument will valid if it can get the data of the research variables exactly. Anas Sudijono stated that Validity is a characteristic of the good test. To get the validity of an achievement test can be used two ways:[11]

1) Totality of the test validity
2) Item validity

In this research, the researcher used item validity to get the validity of instrumentation. Item validity is a part of the test as a totality to measure the test by items. Where, the test consisted of 40 tests that was divided in to two groups. They are 20 for pre-test and 20 for post-test.

To know the validity of the each question was refer to list *r* biserial with r_t *in 5% significant*: 0, 361 and 1% significant: 0, 463. So, if $r_{account} > r_{table}$ the test is classified valid.

So, to get the validity of the test, the formula of *r pointbiserial* can be used as follow:

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[10] Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan* … p. 211

[11] Anas Sudijono.*Pengantar Evaluasi Pendidikan* (Jakarta: PT Raja GrafindoPersada, 1996), p. 163.

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

Where:

r_{pbi} : Coefficient item validity

M_p : Mean score of the total sore

SD_t : Standard Deviation of the total score

p : Presentation of the right answer of the item tested validity.

q : Presentation of the wrong answer of the item tested validity.

b. Reliability of the Test

An instrument test of the research must be reliable. A reliability test is consistent and dependable.[12] Suharsimi Arikunto said that to obtain the reliability of the test, the researcher uses formula K-R 20.[13]

The formula:

$$R_{11} = \left(\frac{n}{n-1}\right) \quad \left(\frac{S_t^2 - \sum pq}{S_t^2}\right)$$

Where:

R_{11} : Reliability of the Instrument

N : Total of Question

[12] H. Douglas Brown, *Language Assessment Practical and Language Practice*, (San Francisco: Longman, 2003), p. 21

[13] Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan . . .* p. 188

St^2 : Variants Total

P : Proporsi Subject who is right Answer(1)
N

Q : Proporsi Subject who is Wrong Answer (0)
N

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 KR-20.

F. Procedure of the Research

Collecting the instrument is important in a research. But, collecting the data is more important for the researcher who uses a method in the research. Collecting the data is uses to determine the result of the research. The researcher gives test to students. The test divided into two kinds; pre-test and post-test. Each of tests has some steps; they are:

a. Pre-Test

The pre-test is conducted to find out the homogeneity of the sample. The function of the pre-test is to find the mean scores of the xperimental class and control class before the researcher gave treatment to the experimental group. In this case, the researcher hoped that the whole students' vocabulary mastery, or if there is a difference between those classes, the difference is hopefully not significant.

b. Treatment

The experimental class and control class was given the same materials, which consist of communication aspects that take by the teacher in different ways. The experimental class was given treatment by using puzzle and control class was taught only by translate by using dictionary.

c. Post-test

After giving the treatment, the researcher conducted a post-test which the different test with the pre-test, and has not been conducted with the previous of the research. This post-test is the final test in the research, especially measuring the treatment, whether is the media has an effect or not. After conducting the post-test, the researcher analyzed the data. Then, the researcher found out the effect of puzzle in the experimental class.

G. Technique for Data Analysis

In this research, the researcher uses the technique of data analysis as follow:

1. Requirement Test

   a) Normality test by using *Chi – Quadrat* 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

b) Homogeneity test

To test the data whether homogeny or not, the researcher uses Harley rest, as follow:[14]

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

Hypotheses is accepted if $F_{(count)} \leq F_{(table)}$

Hypotheses is rejected if $F_{(count)} \geq F_{(table)}$

2. Hypothesis test

Based on the hypothesis, the analysis of the data will be done to find out the ability of two groups that have been divided into experiment class and control class. From the hypothesis is to answer the result of the research. So, the data will be analyzed by using the following *t-test* formula:[15]

[14] Agus Irianto, *Statistik Konsep Dasar* … p. 276.
[15] Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan* . . . p. 311.

$H_{a:} \mu_1 > \mu_2$

$H_o : \mu_1 \leq \mu_2$

If $H_{a:} \mu_1 > \mu_2$, it means the result of students' vocabulary mastery by using puzzle at eighth grade of MTs N 2 Padangsidimpuan is better than conventional method. But, if the $H_0: \mu_1 \leq \mu_2$, it means the result of students' vocabulary mastery by using puzzle at eighth grade of Mts n 2 Padangsidimpuan was not better than conventional method. To test the hypothesis, researcher uses the formula as follow:[16]

$$t = \frac{\overline{X}_1 - \overline{X}_2}{s\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

Where:

$\overline{x_1}$ = Mean of experimental class sample

$\overline{x_2}$ = Mean of control class sample

n_1 = Total of experimental class sample

n_2 = Total of control class sample

[16] Sugiyono,.*Statistika untuk Penelitian.* (Bandung: Alfabeta, 2011), p. 138-139.

CHAPTER IV

DATA ANALYSIS

This chapter presents research result. In this case, it discussed the effect of puzzle on students' vocabulary mastery. The researcher has calculated the data using pre test and post test. Applying quantitative research, the research used the formulation of T-test. Next, researcher will describe the result based on the data that has been researched as follow:

A. Description of Data

1. Description of Data Before Using Puzzle

a. Score of Pre-Test Experimental Class

In pre-test experimental class, the researcher calculated the result that got by the students in answering the question (test). The scores pre-test experimental class could be seen in the following table.

Tabel V
The score of Experimental Class in Pre-Test

Total	2180
Highest score	75
Lowest score	45
Mean	73
Median	72.3
Modus	66
Range	30
Interval	5
Standart deviation	9.35
Varians	89.07

Based on the table above the total score of experiment class in pre-test was 2180, mean was 73, standart deviation was 9.35, varians was 89.07,

median was 72.3, range was 30, modus was 66, interval was 5. The researcher got the highest score was 75 and the lowest score was 45. It can be seen on appendix 18. Then, the computed of the frequency distribution of the students' score of experiment class could be applied into table frequency distribution as follow:

Table VI
Frequency Distribution of Students' Score

No	Interval	Mid Point	Frequency	Percentages
1	45 – 49	47	6	16.21%
2	50 – 54	52	5	13.51%
3	55 – 59	57	5	13.51%
4	60 – 64	62	6	16.21%
5	65 – 69	67	8	21.62%
6	70 – 74	72	4	10.81%
7	75 – 79	77	3	8.10%
$i = 5$			37	100%

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

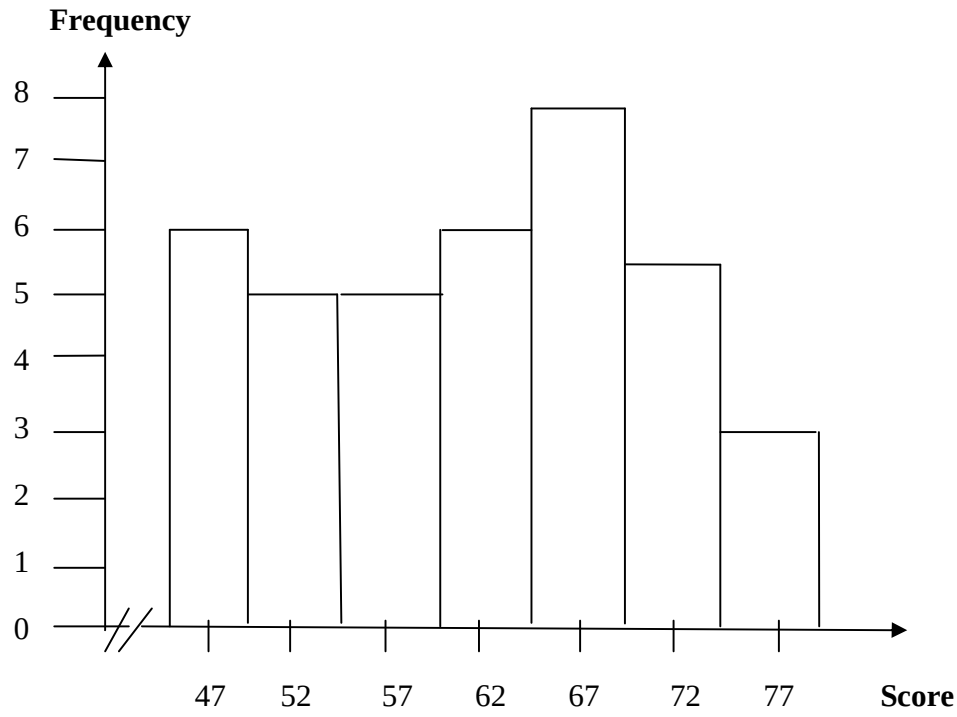

Figure 1: Description Data Pre Test of Experimental Class

b. Score of Pre Test Control Class

In pre-test control class, the researcher calculated the result that got by the students in answering the question (test). The scores of pre test in control class could be seen in the following table:

Tabel VII
The Score of Control Class in PreTest

Total	2090
Highest score	75
Lowest score	45
Mean	63.9
Median	68.7
Modus	62.5
Range	30
Interval	5
Standart deviation	9.2
Varians	87.53

Based on the table above the total score of control class in pre-test was 2090, mean was 63.9, median was 68.7, modus was 62.5, range was 30, interval was 5, standart deviation was 9.2, varians was 87.53. The researcher got the highest score was 75, and the lowest score was 45. It can be seen on appendix 18. Then, the computed of the frequency distribution of the students' score of control class could be applied into table frequency distribution as follow:

Table VIII
Frequency Distribution of Students' Score

No	Interval Class	Mid Point	F	Percentages
1	45 – 49	47	6	16.67%
2	50 – 54	52	6	16.67%
3	55 – 59	57	5	13.88%
4	60 – 64	62	7	19.44%
5	65 – 69	67	6	16.67%
6	70 – 74	72	3	8.33%
7	75 – 79	77	3	8.33%
$i = 5$			36	100%

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

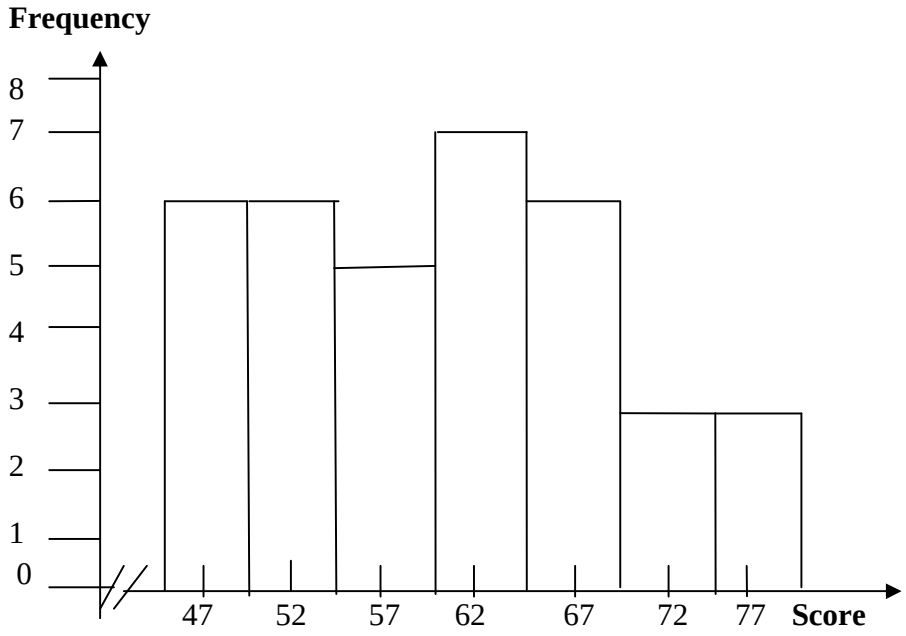

Figure 2: Description Data Pre test of Control Class

2. Description of Data After Using Puzzle

a. Score Post-Test of Experimental Class

In post-test of experimental class, the researcher calculated the result that got by the students in answering the question (test). The result of students' test in experimental class after using puzzle could be seen in the following table.

Tabel IX
Score of Experimental Class in Post-Test

Total	2895
Highest score	95
Lowest score	65
Mean	83.75
Median	85.85
Modus	80.75
Range	30
Interval	5
Standart deviation	9.45
Varians	91.96

Based on the table above the total score of experiment class in post-test was 2895, mean was 83.75, median was 85.85, modus was 80.75, range was 30, interval was 5, standart deviation was 9.45, varians was 91.96. The researcher got the highest score was 95 and the lowest score was 65. The calculation can be seen on the appendix 20. Then, the computed of the frequency distribution of the students' score could be applied into table frequency distribution as follow:

Table X
The Frequency Distribution of Students' Score

No	Interval Class	Mid Point	F	Percentages
1	65 – 69	67	8	21.62%
2	70 – 74	72	2	5.40%
3	75 – 79	77	7	18.91%
4	80 – 84	82	9	24.32%
5	85 – 89	87	3	8.10%
6	90 – 94	92	5	13.51%
7	95 – 99	97	3	8.10%
i = 5			37	100%

Based on the table above, it can be drawn at histogram as follow:

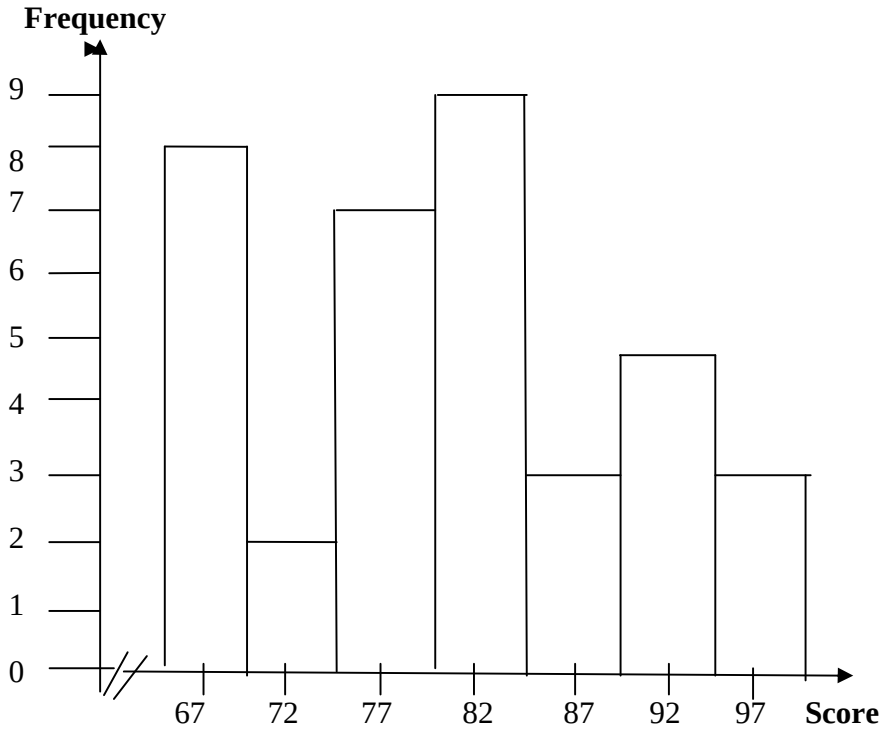

Figure 3: Description Data Post test Experimental Class

b. Score of Control Class in Post-Test

Tabel XI
The Score of Control Class in Post-Test

Total	2465
Highest score	85
Lowest score	55
Mean	63.7
Median	72.5
Modus	67.5
Range	30
Interval	5
Standart deviation	9.1
Varians	84.02

Based on the table above the total score of control class in post-test was 2465, mean was 83.75, median was 72.5, modus was 67.5, range was 30, interval was 5, standart deviation was 9.1, varians was 84.02. The researcher got the highest score was 85 and the lowest score was 55. The researcher got the highest score was 85 and the lowest 55 score was. The calculation can be seen in the appendix 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 XII
Frequency Distribution of Students' Score

No	Interval Class	Mid Point	F	Percentages
1	55 – 59	57	5	13.88%
2	60 – 64	62	5	13.88%
3	65 – 69	67	8	22.22%
4	70 – 74	72	6	16.66%
5	75 – 79	77	5	13.88%
6	80 – 84	82	4	11.11%
7	85 – 89	87	3	8.33%
i = 5			36	100%

Based on the table above, it can be drawn at histogram as follow:

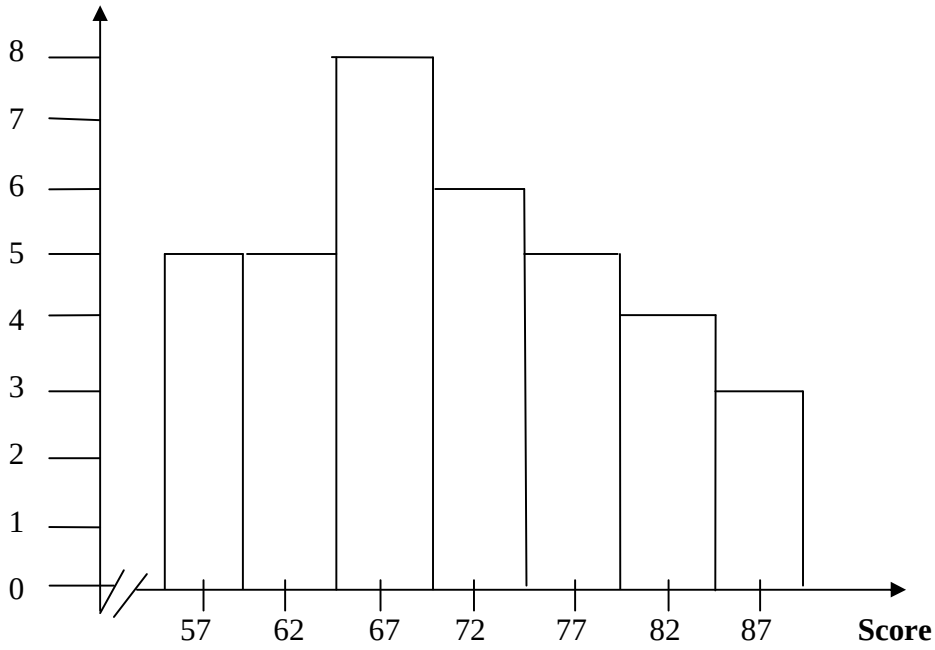

Figure 4: Description Data Post test Control Class

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

Tabel XIII
Normality and Homogenity in Pre-Test

Class	Normality Test		Homogeneity Test	
	t_{count}	t_{table}	t_{count}	t_{table}
Experiment Class	2.18	5.991	1.01 < 2.042	
Control Class	1.44	5.991		

Based on the table above researcher calculation, the score of exsperiment class Lo =2.18<Lt =5.991 with n =37 and control class Lo=1.44< Lt=5.991 with n =36, and real level α 0.05. Cause $_{Lo}$ < Lt in the both class. So, H_a was accepted. It mean that experiment class and control class were distributed normal. It can be seen in appendix 18 and 19.

2) Homogeneity of Experimental Class and Control Class in Pre-test

The coefficient of F_{count} = 1.01 was compared with F table. Where F table was determined at real α =0.05, and the different numerator dk =N-1= 37-1=36 and denominator dk N-1= 36–1= 35 So, by using the list of critical value at F distribution is got $F_{0.05}$= 2.042. It showed that F_{count} (1.01)< F_{table} (2.042). So, the researcher concluded that the variant from the data of the students' Vocabulary Mastery at MTs N 2 Padangsidimpuan by experimental and control class was homogen. The calculation can be seen on the appendix 19.

b. Normality and Homogeneity Post Test

1) Normality of experimental class and control class in Post-test

Tabel XIV
Normality and Homogenity in Post-Test

Class	Normality Test		Homogeneity Test	
	t_{count}	t_{table}	t_{count}	t_{table}
Experiment Class	2.41	5.991	1.09 < 2.042	
Control Class	3.40	5.991		

Based on the table above, the score of eksperimental class Lo=2.42< Lt=5.991 with n =37 and control class Lo=3.40< Lt=5.991 with n=36, real level α was 0.05, Cause $_{Lo}$ < Lt in the both class. So, H_a was accepted, it mean that experiment class and control class were distributed normal. It can be seen on appendix 20 and 22.

2) Homogenity of Experimental Class and Control Class in Post-Test

The coefficient of F_{count} =1.09 was compared with F table. Where F table was determined at real α =0.05, and the different numerator dk=N-1= 37-1=36 and denominator dk N-1= 36–1=35. So, by using the list of critical value at F distribution was got $F_{0.05}$=2.042. It show that F_{count} (1.09) < F_{table} (2.042). So, the researcher concluded that the variant from the data of the students' Vocabulaary Masterty at MTs N 2 Padangsidimpuan by experimental and control class was homogeny. The calculation can be seen on the appendix 22.

2. Hypothesis Test

The data would be analyzed to prove hypothesis by using formula of T-test. Hypothesis alternative (H_a) of research was "There was the effect of Puzzle on Students' Vocabulary Mastery. The calculation can be seen on the appendix 24

Table XV
Result of T-test from the Both Averages

Pre-test		Post-test	
t_{count}	t_{table}	t_{count}	t_{table}
1.80	2.000	39.94	2.000

$H_a: \mu_1 > \mu_2$

Where:

$H_a: \mu_1 > \mu_2$ "Puzzle better than conventional strategy on Students' Vocabulary Mastery."

Based on researcher calculation, researcher found that t_{count} 39.94. while t_{table} 2.000. With opportunity (1 - α) = 1-5% = 95% and dt = (n_1 + n_2 – 2) = (37 + 36 – 2) = 71, cause $t_{count} > t_{table}$ (39.94>2.000). It means that hypothesis (H_a) was accepted. So, there is the significant effect of Puzzle on Students' Vocabulary Mastery. In this case, the mean score of experiment class by using Puzzle was 83.75, and mean score of control class was 63.7. The calculation can be seen on the appendix 18 and 20.

C. Discussion

Based on the related findings, the researcher discussed the result of this research and compared with the related findings. First, Dewi Fitria Azizah's script "Improving Students' Ability in Mastering Vocabulary Through Puzzles and Riddle Game at the Seventh Grade Students of MTs Darul Huda Mayak Tonatan Ponorogo in Academic Year 2010/2011". The concluding of her

research is puzzle and riddle games can improve students' vocabulary mastery at the seventh grade of MTs Darul Huda.

Second, Rosi Rosita script's "Teaching English by Using Puzzle to Improve Students' Vocabulary Mastery (an Experimental Study on the Fifth Grade Students at SDN Tanjunglaya III". The concluding of her research is there was the effect of puzzle on students' vocabulary mastery at the fifth grade of SDN Tanjunglaya. So, the implicaion of puzzle is better than conventional teaching.

The last, Muadib Mahasin's script "An Experimental Study of The Use of Puzzle Game to Improve Vocabulary Mastery of the Third Years Students of MI Maa'rif Tingkir Lor Salatiga in the Academic Year of 2010/2011". The concluding of the research is there was significant effect of puzzle on students' vocabulary mastery on thirdt year of MI Maa'rif Tingkir Lor Salatiga.

Then, the research by using puzzle showed the result of mean score in experimental class was 83.75 and control class was 63.7. It means the result and hypothesis testing showed that puzzle had the effect, and hypothesis alternative (H_a) was accepted and hypothesis zero (H_0) was rejected. It was indicated that the score of experimental class was bigger than control class (83.75>63.7), and also indicated $t_o > t_t$ (39.94 > 2.000).

Based on the explanation above, the researcher concluded that hypotheses alternative was accepted and there was effect of puzzle on students' vocabulary mastery.

D. Threats of the Research

The researcher found the threats of this research as follows:

1. The students needed more time for answering the test.
2. There were some students that were noisy while teaching and learning process. So, it can disturb the concentration of the others.
3. There were some students that were lack of serious to answer the test in pre-test and post-test. It can be the threat of the research. So, the researcher can not reach the validity of trustworthiness data.

CHAPTER V

CONCLUSION AND SUGGESTION

A. Conclusion

Based on the result of the research and calculation of the data, the researcher got the conclusion that there was the effect of puzzle to students' vocabulary mastery at eighth grade of MTs N 2 Padangsidimpuan. The hypothesis alternative (H_a) was accepted. Mean score of experimental class in post test was 83.75, it was bigger than control class (83.75> 63.7) and proven with t_{count} was higher than t_{table} (39.94 > 2.000). So, the researcher concluded that puzzle was an effective to students' vocabulary mastery.

B. Suggestion

After finishing this research, the researcher got much information in English teaching and learning process. Therefore, the writer has suggestion to:

1. The Principal of MTs N 2 Padangsidimpuan, to motivate the teacher, especially English teachers to teach as well as possible by maximizing the using of puzzle in teaching English.
2. The English teacher, the researcher suggests as an English teacher were hoped to use appropriate method to explain or to teach English subject to the students.

3. Other researcher, the researcher hopes that the other researchers who want to conduct a research related to this research to find the others influence of these strategies deeply.

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CURRICULUM VITAE

A. Identity

Name	: NURMALA SARI
Nim	: 11 340 0027
Place and Birthday	: Hajoran, 29th October 1992
Sex	: Female
Religion	: Moslem
Address	: Hajoran, Kec. Sei Kanan, Kab. Labuhan Batu Selatan

B. Parent

1. Father's name : Alm. H. Bahari Ritonga
2. Mother's name : Paridah Ariati

C. Educational Background

1. Elementary School	: SDN 112249 Hajoran	(2005)
2. Junior High School	: PP. Ahmadul Jariah Utama Kota Pinang	(2008)
3. Senior High School	: MAS PP Nurul Falah Tj. Marulak	(2011)
4. Institute	: IAIN Padangsidimpuan	(2015)

Appendix 1

Experimental Class

RENCANA PELAKSANAAN PEMBELAJARAN

(RPP)

Nama Sekolah : MTs Negeri 2 Padangsidimpuan

Mata Pelajaran : Bahasa Inggris

Kelas/Semester : VIII[1] (Delapan)/ I

Alokasi Waktu : 4x 40 menit

Standar Kompetensi : Memahami makna kosakata-kosakata pada teks yang berkaitan dengan lingkungan sekitar.

Kompetensi Dasar :

- Mampu mengucapkan kosakata dengan benar
- Memahami kosakata yang dipelajari
- Mampu mengunakan kosakata yang dipelajari dalam percakapan

A. Indikator : Mampu memahami kosakata di bawahini

Soap, money, house, sugar, carrot, ball, oil, brush, air, snake, lion, shirt, tear, rain, meat, sand, butter, table, iron, pen.

B. Tujuan pembelajaran :

- Siswa mampu mengucapkan dan menyebutkan kosakata countable dan uncountable noun yang ada di lingkungan sekitar.

Karakter siswa yang diharapkan:

- Dapat dipercaya (*Trustworthiness*)
- Rasa hormat dan perhatian (*Respect*)
- Tekun (*Diligence*)

C. MediaPembelajaran : Puzzle

D. Langkah-langkah Pembelajaran

Pertemuan Pertama

NO	KEGIATAN PEMBELAJARAN	WAKTU
1	Pendahuluan a. Greeting/salam b. Absensi c. Berdo'a d. Menjelaskan indikator dan memberi motivasi	10 Minutes
2	Kegiatan Inti - Eksplorasi: Menggunakan beragam pendekatan pembelajaran, media pembelajaran, dan sumber belajar lain. a. Guru menyajikan bahan vocabulary mengenai countable dan uncountable noun. b. Guru menerangkan vocabulary yang berkaitandengan menggunakan puzzle. c. Guru memberikan ide terhadap beberapa kata kunci yang berhubungan dengan subjek yang telah di pelajari. - Konfirmasi: Guru Berfungsi sebagai narasumber dan fasilitator dalam menjawab pertanyaan peserta didik yang menghadapi kesulitan	60 Minutes
3	Kegiatan Penutup: membuat rangkuman/ simpulan pelajaran Salam	10 Minutes

Pertemuan Kedua

NO	KEGIATAN PEMBELAJARAN	WAKTU
1	Kegiatan Pendahuluan a. Greeting/salam b. Absensi c. Berdo'a d. Menjelaskan indikator danmemberi motivasi	10 minutes
2	Kegiatan Inti Elaborasi: Memfasilitasi peserta didik melalui pemberian tugas, diskusi dan lain-lain a. Siswa menjawab soal yang akan diberikan guru b. Guru memberikan penghargaan yang diberikan kepada siswa yang mendapatkan poin tertinggi Konfirmasi: Guru Berfungsi sebagai narasumber dan fasilitator dalam menjawab pertanyaan peserta didik yang menghadapi kesulitan	60 minutes
3	Kegiatan penutup: salam dan guru menyimpulkan pembelajaran	10 minutes

E. SumberBelajar :

- Buku yang berkaitan

F. Media : -

- Picture

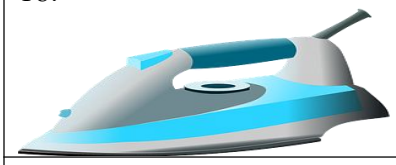
G. Learning Material

Spelling puzzle in this case is the researcher disordered the letters of word, then the students arrange it to be a word that the researcher determine before.

Students arrange the letters to be a word suitable the picture or clue!

1 	B – A – B – C – E – A – G
2 	T – R – E – T – B – U
3. 	T – A – M – E
4. 	Y – N – O – M – E
5. 	G – R – U – S – A
6. Something fall from the human eyes	R – A - T – E

7. 	A – D – N – S
8. We always use it in our body	T – I – H – S – R
9. 	O – R – T – R – C – A
10. 	H – R – B – S – U
11. Students' writing tool	N – P – E
12. 	P – A – S – O
13. Long and naxious	K – A – N – S – E
14. 	L – B – L – A
15. 	N – I – A – R
16.	S – O – U – E – H

	
17. Where do students put their studying tool in the classroom?	B – E – T – L – A
18. 	R – O – N – I
19. Something always we breathe	R – I – A
20 	L – O – I

H. Penilaian : The amount of correct answer in multiple choice!

Indikator Pencapaian Kompetensi	Teknik Penilaian	Bentuk Instrument	Instrument soal
1. Mengidentifikasi countable noun 2. Mengidentifikasi uncountable noun	Testulisan	Answer the correct answer	Answer the multiple choice

Padangidimpuan, 05 Oktober 2015

Peneliti

Nurmala Sari
Nim. 11 340 0027

Appendix 2

Control Class

RENCANA PELAKSANAAN PEMBELAJARAN

(RPP)

Nama Sekolah	: MTs Negeri 2 Padangsidimpuan
Mata Pelajaran	: Bahasa Inggris
Kelas/Semester	: VIII^3 (Delapan)/I
Alokasi Waktu	: 4 x 40 menit

Standar Kompetensi : Memahami makna instruksi dan informasi yang berkaitan dengan lingkungan sekitar.

Kompetensi Dasar : Merespon makna kosakata yang terdapat dalam instruksi dan informasi secara akurat dan lancar yang berkaitan dengan lingkungan sekitar.

A. Indikator :Mampu memahami kosakata di bawah ini

Soap = sabun, money = uang, house = rumah, sugar = gula, carrot = wortel, ball = bola, oil = minyak, brush = brus, air = udara, snake = ular, lion = singa, shirt = baju, tear = air mata, rain = hujan, meat = daging, sand = pasir, butter = mentega, table = meja, iron = setrika, pen = pena.

B. Tujuan Pembelajaran :

- Siswa mampu mengucapkan dan menyebutkan kosakata countable dan uncountable noun yang ada di lingkungan sekitar.

Karakter siswa yang diharapkan:

- Dapat dipercaya (*Trustworthiness*)
- Rasa hormat dan perhatian (*Respect*)
- Tekun (*Diligence*)

C. Metode Pembelajaran : Conventional method in teaching

D. Langkah-langkah Kegiatan

Pertemuan pertama

NO	KEGIATAN PEMBELAJARAN	WAKTU
1	Pre Activities a. Greeting/salam b. Absensi c. Berdo'a d. Menjelaskan indikator dan memberi motifasi	10 minutes
2	Main Activities - Eksplorasi :Memfasilitasi terjadinya interaksi antar peserta didik, antara peserta didik dengan guru, lingkungan dan sumber belajar lain a. Guru menyajikan pelajaran. - Elaborasi: Memfasilitasi peserta didik mengenai materi vocabulary yaitu tentang profession, illness, fruits, sports and animals b. Guru mengartikan kosakata-kosakata tersebut dengan menggunakan bahasa ibu. - Konfirmasi : Guru Berfungsi sebagai narasumber dan fasilitator dalam menjawab pertanyaan peserta didik yang menghadapi kesulitan.	60 minutes
3	Post Activity a. Salah satu siswa memberi kesimpulan b. Siswa lain merespon	10 minutes

Pertemuan kedua

NO	KEGIATAN PEMBELAJARAN	WAKTU
1	Pre Activities a. Greeting/salam b. Absensi c. Berdo'a d. Menjelaskan indikator dan memberi motivasi	10 minutes
2	Main Activities	60 minutes

	- Eksplorasi :Memfasilitasi terjadinya interaksi antar peserta didik, antara peserta didik dengan guru,lingkungan dan sumber belajar lain a. Siswa menjawab soal yang diberikan guru b. Guru memberikan penghargaan - Konfirmasi : Guru Berfungsi sebagai narasumber dan fasilitator dalam menjawab pertanyaan peserta didik yang menghadapi kesulitan	
3	Post Activity Kegiatan penutup: salam dan guru menyimpulkan pembelajaran	10 minutes

E. Sumber Belajar **:**

- Buku yang berkaitan
- Kamus Bahasa Inggris

F. Penilaian **:** The amount of correct answer the multiple choice!

IndikatorPencapaianKompetensi	**TeknikPenilaian**	**BentukInstrument**	**Instrument soal**
1. Mengidentifikasi countable noun 2. Mengidentifikasi uncountable noun	Tes tulisan	Answer the correct answer	Answer the multiple choice

Padangsidimpuan, 07 Oktober 2015

Peneliti

Nurmala Sari
Nim. 11 340 0027

APPENDIX 3

INSTRUMENT OF PRE TEST

Name :
Class :

1. What is fried to be bakwan in our environment?
   a. Banana c. Tofu
   b. Cabbage d. Fish
2. Animal that has beautiful voice for singing is...
   a. Bird c. Chicken
   b. Goose d. Duck
3. What is always called by hot?
   a. Sugar c. Chili
   b. Onion d. Tomato
4. Where is students put in their studying tools?
   a. Box c. Table
   b. Cupboard d. Bag
5. Something is given to the guest, such as milk, coffee, juice, and...
   a. Tea c. Apple
   b. Bread d. Banana
6. Chicken produces....
   a. Ken c. Meat
   b. Milk d. Egg
7. Same as longbean, but it is shorter. What is it?
   a. Bean c. Carrot
   b. Chili d. Celery
8. It has long neck and amphibian animal, what is it?
   a. Goose c. Heron
   b. Crocodile d. Giraffe
9. The taste of the fruit is sour. What is it?
   a. Tomato c. Cherry
   b. Grape d. Watermelon
10. It is a kinds of drinking that has high calcium. What is it?
    a. Ice c. Soft drink
    b. Water d. Milk
11. What vegetable that always eaten by Popeye?
    a. Brocoli c. Cassava
    b. Spinach d. Cucumber
12. Cat's favourite food. What is it?
    a. Fish c. Crab
    b. Shrimp d. Meat
13. What big fish that loves playing in the sea?

a. Tuna fish
b. Dolphin
c. Pope
d. Shark

14. What is always uses as a drawing tool without color?
    a. Marker
    b. Paint
    c. Pencil
    d. Pen
15. What is that can make colour in pen?
    a. Paint
    b. Ink
    c. Marker
    d. Pandanus
16. Synonim of mind is...
    a. Statement
    b. Opinion
    c. Idea
    d. Brain
17. It is one of expensive fruit. What is it?
    a. Banana
    b. Grape
    c. Watermelon
    d. Soursop
18. Something always we drink it. What is it?
    a. Juice
    b. Ice cream
    c. Ice
    d. Water
19. Something can be seat.
    a. Chair
    b. Floor
    c. Table
    d. Stair
20. Shampoo is very important for it...
    a. Head
    b. Hair
    c. Body
    d. Fur

APPENDIX 4

INSTRUMENT OF POST TEST

Name :
Class :

1. Something that we used to wash the body. What is it?
   a. Toothpaste
   b. Brush
   c. Towel
   d. Soap
2. What is our paying tool?
   a. Money
   b. Clothes
   c. Computer
   d. Salary
3. We and family live in…..
   a. House
   b. Wood
   c. Sea
   d. Beach
4. Sweet taste is….
   a. Salt
   b. Sugar
   c. Sauce
   d. Ice
5. What is always eaten by rabbit?
   a. Fruit
   b. Vegetable
   c. Cabbage
   d. Carrot
6. What does play by foot?
   a. Badminton
   b. Boxing
   c. Ball
   d. Volly ball
7. Something use for frying is…..
   a. Snack
   b. Bread
   c. Water
   d. Oil
8. What is cleaning tool in the bathroom?
   a. Soap
   b. Brush
   c. Toothpaste
   d. Towel
9. Something we breathe. What is it?
   a. Air
   b. Water
   c. Rain
   d. Waterfall
10. What animal is that can beat and enlace the victim?
    a. Dog
    b. Tiger
    c. Lion
    d. Snake
11. Yellow fur has by….
    a. Lion
    b. Tiger
    c. Cow
    d. Buffalo

12. What clothes is use in our body?
    a. Vail
    b. Trouser
    c. Shirt
    d. Skirt
13. What water is fall from eye?
    a. Waterfall
    b. Water
    c. Tear
    d. Rain
14. What water is fall form the sky?
    a. Rain
    b. Tear
    c. Water
    d. Waterfall
15. Food that has high protein and good for us….
    a. Salt fish
    b. Rice
    c. Shrimp
    d. Meat
16. What is something that use in building house?
    a. Water
    b. Sand
    c. Pail
    d. Paint
17. Always combine with bread. What is it?
    a. Butter
    b. Apple
    c. Ice
    d. Pineapple
18. Where does the students put heir studying tool in the classroom?
    a. Chair
    b. Table
    c. Floor
    d. In front of the class
19. By using what is our mother makes the clothes be tidy?
    a. Iron
    b. Detergent
    c. Rapika
    d. Soap
20. Students writing tool is…
    a. Paint
    b. Crayon
    c. Marker
    d. Pen

APPENDIX 5

KEY ANSWER OF PRE TEST

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

KEY ANSWER OF POST TEST

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

Appendix 6

Validity Pre Test

NO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	Xt	Xt^2
1	0	1	0	0	0	1	0	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	0	0	1	16	256
2	1	1	0	1	0	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	0	1	0	1	1	18	324
3	1	1	0	0	1	1	1	0	1	0	1	1	1	1	0	0	0	0	1	1	0	1	1	0	1	16	256
4	0	1	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	5	25
5	0	0	1	1	0	1	1	1	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	1	0	10	100
6	1	1	1	0	1	1	1	1	1	0	1	1	0	1	0	0	1	0	1	1	0	0	1	0	0	14	196
7	1	1	0	1	1	1	1	1	0	1	1	0	0	1	1	1	1	1	1	1	1	1	0	1	0	18	324
8	1	1	0	1	0	0	0	1	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	7	49
9	1	1	0	1	1	1	1	0	0	1	1	1	0	1	1	0	1	0	1	1	0	0	0	0	0	14	196
10	1	1	0	1	0	1	1	1	0	1	1	0	1	1	1	1	1	0	1	1	1	1	0	1	1	19	361
11	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	21	441
12	1	1	0	1	1	1	1	1	0	0	1	1	0	0	1	1	0	0	1	1	1	1	1	0	0	16	256
13	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	4	16
14	1	1	0	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	19	361
15	0	0	0	1	1	0	1	1	0	1	1	1	1	0	1	1	0	0	1	1	0	1	0	0	1	15	225
16	1	1	0	1	0	1	0	0	0	1	1	1	1	1	1	1	1	0	1	0	0	1	1	1	1	17	289
17	1	0	1	1	1	1	1	0	1	0	1	1	0	1	1	0	0	0	0	1	0	0	0	1	1	14	196
18	1	0	0	1	1	1	0	1	0	1	0	1	1	0	1	1	1	0	0	0	1	1	0	0	1	13	169
19	1	0	0	0	1	1	0	1	0	1	0	0	1	1	0	1	1	1	0	0	0	1	0	1	1	13	169
20	0	1	1	1	1	0	0	0	1	1	0	0	1	1	1	1	1	0	1	1	0	0	0	0	1	14	196
21	1	1	0	0	0	1	1	0	0	1	1	1	1	0	1	0	1	0	1	1	0	1	0	1	1	15	225
22	1	0	1	0	1	1	1	1	1	0	1	1	0	0	1	1	1	0	1	1	0	1	0	1	0	16	256
23	1	1	0	1	1	1	1	0	0	1	0	1	1	0	0	0	0	1	1	1	0	1	1	1	1	16	256
24	1	1	0	0	1	0	0	1	0	1	1	1	1	1	1	1	1	0	1	1	0	1	0	0	1	16	256
25	0	0	0	1	0	1	1	1	0	0	1	1	0	1	1	1	0	0	1	1	0	1	0	1	1	14	196
N= 25	19	17	5	15	16	17	16	18	5	18	18	18	15	18	17	15	15	6	18	18	6	16	5	16	16	362	5726
p	0, 7	0,6	0,2	0,6	0,6	0,5	0, 5	0,7	0, 2	0, 7	0, 7	0,7	0, 5	0,7	0,6	0,5	0,5	0,2	0,7	0,7	0, 2	0,6	0,2	0,6	0,6	∑xt	$\sum xt^2$
q	0. 2	0,3	0,8	0,4	0,3	0,4	0, 4	0,3	0, 8	0, 3	0, 3	0,3	0, 4	0,3	0,3	0,4	0,4	0,7	0,3	0,3	0, 7	0,3	0,8	0,3	0,3		

Appendix 12

Reliability Pre Test

NO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	Xt	Xt²
1	0	1	0	0	0	1	0	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	0	0	1	16	256
2	1	1	0	1	0	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	0	1	0	1	1	18	324
3	1	1	0	0	1	1	1	0	1	0	1	1	1	1	0	0	0	0	1	1	0	1	1	0	1	16	256
4	0	1	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	5	25
5	0	0	1	1	0	1	1	1	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	1	0	10	100
6	1	1	1	0	1	1	1	1	1	0	1	1	0	1	0	0	1	0	1	1	0	0	1	0	0	14	196
7	1	1	0	1	1	1	1	1	0	1	1	0	0	1	1	1	1	1	1	1	1	1	0	1	0	18	324
8	1	1	0	1	0	0	0	1	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	7	49
9	1	1	0	1	1	1	1	0	0	1	1	1	0	1	1	0	1	0	1	1	0	0	0	0	0	14	196
10	1	1	0	1	0	1	1	1	0	1	1	0	1	1	1	1	1	0	1	1	1	1	0	1	1	19	361
11	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	21	441
12	1	1	0	1	1	1	1	1	0	0	1	1	0	0	1	1	0	0	1	1	1	1	1	0	0	16	256
13	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	4	16
14	1	1	0	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	19	361
15	0	0	0	1	1	0	1	1	0	1	1	1	1	0	1	1	0	0	1	1	0	1	0	0	1	15	225
16	1	1	0	1	0	1	0	0	0	1	1	1	1	1	1	1	1	0	1	0	0	1	1	1	1	17	289
17	1	0	1	1	1	1	1	0	1	0	1	1	0	1	1	0	0	0	0	1	0	0	0	1	1	14	196
18	1	0	0	1	1	1	0	1	0	1	0	1	1	0	1	1	1	0	0	0	1	1	0	0	1	13	169
19	1	0	0	0	1	1	0	1	0	1	0	0	1	1	0	1	1	1	0	0	0	1	0	1	1	13	169
20	0	1	1	1	1	0	0	0	1	1	0	0	1	1	1	1	1	0	1	1	0	0	0	0	1	14	196
21	1	1	0	0	0	1	1	0	0	1	1	1	1	0	1	0	1	0	1	1	0	1	0	1	1	15	225
22	1	0	1	0	1	1	1	1	1	0	1	1	0	0	1	1	1	0	1	1	0	1	0	1	0	16	256
23	1	1	0	1	1	1	1	0	0	1	0	1	1	0	0	0	0	1	1	1	0	1	1	1	1	16	256
24	1	1	0	0	1	0	0	1	0	1	1	1	1	1	1	1	1	0	1	1	0	1	0	0	1	16	256
25	0	0	0	1	0	1	1	1	0	0	1	1	0	1	1	1	0	0	1	1	0	1	0	1	1	14	196
N= 25	19	17	5	15	16	17	16	18	5	18	18	18	15	18	17	15	15	6	18	18	6	16	5	16	16	362	5726
p	0,7	0,6	0,2	0,6	0,6	0,5	0, 5	0,7	0,2	0, 7	0,7	0,7	0,5	0,7	0,6	0,5	0,5	0,2	0,7	0,7	0, 2	0,6	0,2	0, 6	0,6	∑xt	∑xt²
q	0.2	0,3	0,8	0,4	0,3	0,4	0, 4	0,3	0,8	0, 3	0,3	0,3	0,4	0,3	0,3	0,4	0,4	0,7	0,3	0,3	0, 7	0,3	0,8	0, 3	0,3		
pq	0.1 4	0.1 8	0.1 6	0.2 0	0.1 8	0.2 0	0. 20	0.2 1	0.1 6	0. 21	0.2 1	0.2 1	0.20	0.2 1	0.1 8	0.2 0	0.2 0	0.20	0.2 1	0.2 1	0. 24	0.1 8	0.1 6	0. 18	0.2 0	5.26 8	

Appendix 7

Calculation of r_{pbi} = in Pre-Test

A. Calculation of Pre-Test

1. **Means score from score total (M_t)**

M_t =

M_t = = 14.48

2. **Standard Deviation (SD_t)**

SD_t =

SD_t =

SD_t =

SD_t = = = 4.40

3. **Means Score (M_p)**

Item 1 M_{p1}=

M_{p1} =

M_{p1} = = 14.52

Item 2 M_{p2} =

M_{p2} =

M_{p2} = = 15.70

Item 3 M_{p3} =

M_{p3}=

M_{p3} = = 14.60

Item 4 M_{p4} =

M_{p4} =

M_{p4} = = 15.06

Item 5 M_{p5} =

M_{p5} =

M_{p5} = = 14.68

Item 6 M_{p6} =

M_{p6} =

M_{p6} = = 17.58

Item 7 M_{p7} =

M_{p7} = =

M_{p7} = = 15.93

Item 8 M_{p8} =

M_{p8}=

M_{p8} = = 14.11

Item 9 M_{p9} =

M_{p9} =

M_{p9} = 14.80

Item 10 M_{p10} =

M_{p10} =

M_{p10} = = 14.77

Item 11 M_{p11} =

M_{p11} =

M_{p11} = = 16.00

Item 12 M_{p12} =

M_{p12} =

M_{p12} = = 16.16

Item 13 M_{p13} =

M_{p13} =

M_{p13} = = 15.86

Item 14 M_{p14} =

M_{p14} =

M_{p14} =

Item 15 M_{p15} =

M_{p15} =

M_{p15} = = 15.11

Item 16 M_{p16} =

M_{p16} =

M_{p16} =

Item 17 M_{p17} =

M_{p17} =

M_{p17} =

Item 18 M_{p18} =

M_{p18} =

M_{p18} =

Item 19 M_{p19} =

M_{p19} =

M_{p19} =

Item 20 M_{p20} =

M_{p20} =

M_{p20} =

Item 21 M_{p21} =
M_{p21} =
M_{p21} =

Item 22 M_{p22} =
M_{p22}=
M_{p22} =
Item 23 M_{p23} =
Mp_{23} =
M_{p23} =

Item 24 M_{p24} =
M_{p24} =
M_{p24} = 13.43

Item 25 M_{p25} =
M_{p25} =
M_{p25} =

4. Calculation of the Formulation

Item 1=

r_{pbi} =

r =
r = 0.009 x 1.870 = 0.017

Item 2 r_{pbi} =

r =
r = 0.197 x 1.414 = 0.401

Item 3 r_{pbi} =

r =
r = -0.2 x 0.5 = 0.390

Item 4 r_{pbi} =

r =
r = 0.131 x 1.224 = 0.400

Item 5 r_{pbi} =

r =
r = 0.063 x 1.414 = 0.089

Item 6 r_{pbi} =

r =
r = 0.704 x 1.414 = 0.995

Item 7 r_{pbi} =

r =
r = 0.329 x 1.414 = 0.465

Item 8 r_{pbi} =

r =
r = -0.084 x 1.870 =- 0.157

Item 9 r_{pbi} =

r =
r = 0.072 x 0.5 = 0.036

Item 10 r_{pbi} =

r =
r = 0.065 x 1.870 = 0.390

Item 11 r_{pbi} =

r =
r = 0.345 x 1.870 = 0.645

Item 12 r_{pbi} =

r =
r = 0.381 x 1.870 = 0.712

Item 13 r_{pbi} =

r =
r = 0.313 x 1.224 = 0.383

Item 14 r_{pbi} =

r =
r = 0.129 x 1.870 = 0.412

Item 15 r_{pbi} =

r =
r = 0.143 x 1.414= 0.398

Item 16 r_{pbi} =

r =
r = 0.420 x 1.118 = 0.469

Item 17 r_{pbi} =

r =
r = 0.390 x 1.118 = 0.437

Item 18 r_{pbi} =

r =
r = 0.459 x 0.534 = 0.397

Item 19 r_{pbi} =

r =
r = 0.129 x 1.527 = 0.385

Item 20 r_{pbi} =

r =
r = 0.381x 1.527 = 0.583

Item 21 r_{pbi} =
r =
r = 0.534x 0.529 = 0.385

Item 22 r_{pbi} =

r =
r = 0.386 x 1.414 = 0.546

Item 23 r_{pbi} =
r =
r = 0.300 x 0.500 = 0.411

Item 24 r_{pbi} =
r =

r = -0.304x 1.414 = -0.430

Item 25 r_{pbi} =

r =
r = 0.345 x 1.414 = 0.488

Appendix 10

Calculation of r_{pbi} = in post-test

B. Calculation of Post-Test

1. Means Score from Score Total (M_t)

M_t =
M_t = = 18.08

2. Standard Deviation (SD_t)

SD_t =
SD_t =
SD_t =
SD_t = = = 5.2

3. Means Score (M_p)

Item 1 M_{p1} =
M_{p1}=
M_{p1} = = 19.25

Item 2 M_{p2}=
M_{p2} =
M_{p2} = = 19.50

Item 3 M_{p3} =
M_{p3}=
M_{p3} = = 19.19

Item 4 M_{p4} =
M_{p4} =
M_{p4} = = 17.85

Item 5 M_{p5} =
M_{p5} =
M_{p5} =

Item 6 M_{p6} =
M_{p6} =
M_{p6} = = 19.09

Item 7 M_{p7} =
M_{p7} =

$M_{p7} =$ $= 14.90$

Item 8 $M_{p8} =$

$M_{p8} =$

$M_{p8} = = 19.63$

Item 9 $M_{p9} =$

$M_{p9} =$

$M_{p9} =$

Item 10 $M_{p10} =$

$M_{p10} =$

$M_{p10} =$ $= 20.05$

Item 11 $M_{p11} =$

$M_{p11} =$

$M_{p11} =$ $= 20.13$

Item 12 $M_{p12} =$

$M_{p12} =$

$M_{p12} =$ $= 20.19$

Item 13 $M_{p13} =$

$M_{p13} =$

$M_{p13} =$ $= 17.10$

Item 14 $M_{p14} =$

$M_{p14} =$

$M_{p14} =$ $= 19.10$

Item 15 $M_{p15} =$

$M_{p15} =$

$M_{p15} =$ $= 19.84$

Item 16 $M_{p16} =$

$Mp_{16} =$

$M_{p16} =$

Item 17 $M_{p17} =$

$M_{p17} =$

$M_{p17} =$

Item 18 $M_{p18} =$

$M_{p18} =$

$M_{p18} =$

Item 19 $M_{p19} =$

M_{p19} =
M_{p19} =

Item 20 M_{p20} =
M_{p20} =
M_{p20} =

Item 21 M_{p21} =
M_{p21} =
M_{p21} =

Item 22 M_{p22} =
M_{p22}=
M_{p22} =

Item 23 M_{p23} =
M_{p23} =
M_{p23} =

Item 24 M_{p24} =
M_{p24} =
M_{p24} = = 18.66

Item 25 M_{p25} =
M_{p25} =
M_{p25} =

4. Calculation of the Formulation

Item 1=

r_{pbi} =
r =
r = 0.225 x 2 = 0.450

Item 2 r_{pbi} =

r_{pbi} =
r = 0.273 x 0.894 = 0.244

Item 3 r_{pbi} =

r_{pbi} =
r = 0.213 x 2 = 0.426

Item 4 r_{pbi} =

r_{pbi} =

r = -0.044 x 1.118 = -0.049

Item 5 r_{pbi} =

r_{pbi} =

r = 0.417 x 2 = 0.834

Item 6 r_{pbi} =

r_{pbi} =

r = 0.194 x 3 = 0.582

Item 7 r_{pbi} =

r_{pbi} =

r = -0.029 x 1.118 = -0.032

Item 8 r_{pbi} =

r_{pbi} =

r = 0.298 x 3 = 0.894

Item 9 r_{pbi} = =

r_{pbi} =

r = 0.330 x 2 = 0.660

Item 10 r_{pbi} =

r_{pbi} =

r = 0.378 x 1.870= 0.706

Item 11 r_{pbi} =

r_{pbi} =

r = 0.394 x 3 = 1.182

Item 12 r_{pbi} =

r_{pbi} =

r = 0.405 x 2.828 = 1.145

Item 13 r_{pbi} =

r_{pbi} =

r = -0.188 x 0.812 = -0.148

Item 14 r_{pbi} =

r_{pbi} =
r = 0.196 x 2 = 0.392

Item 15 r_{pbi} =

r_{pbi} =
r = 0.338 x 1.870 = 0.632

Item 16 r_{pbi} =

r_{pbi} =
r = 0.465 x 2 = 0.930

Item 17 r_{pbi} =

r_{pbi} =
r = 0.230 x 2.828 = 0.650

Item 18 r_{pbi} =

r_{pbi} =
r = 0.398 x 2 = 0.796

Item 19 r_{pbi} =

r_{pbi} =
r = 0.240 x 0.707 = 0.169

Item 20 r_{pbi} =

r_{pbi} =
r = 0.561 x 0.707 = 0.396

Item 21 r_{pbi} =

r_{pbi} =
r = 0.369 x 2.828 = 0.043

Item 22 r_{pbi} =

r_{pbi} =
r = 0.303 x 2.828 = 0.856

Item 23 r_{pbi} =

r_{pbi} =
r = 0.465 x 2 = 0.930

Item 24 r_{pbi} =

r_{pbi} =
r = 0.111 x 2.828 = 0.425

Item 25 r_{pbi} =

r_{pbi} =
r = 0.267 x 2.828 = 0.755

Appendix 8

Table Validity of Pre- Test

Number of Item				P	Q		on 5% significant	Interpretation
1.	14.52	14.48	4.40	0.7	0.2	0.017	0.381	Invalid
2.	15.70	14.48	4.40	0.6	0.3	0.401	0.381	Valid
3.	14.60	14.48	4.40	0.2	0.8	0.390	0.381	Valid
4.	15.06	14.48	4.40	0.6	0.4	0.400	0.381	Valid
5.	14.68	14.48	4.40	0.6	0.3	0.089	0.381	Invalid
6.	17.58	14.48	4.40	0.6	0.3	0.995	0.381	Valid
7.	15.93	14.48	4.40	0.6	0.3	0.469	0.381	Valid
8.	14.11	14.48	4.40	0.7	0.2	- 0.057	0.381	Invalid
9.	14.80	14.48	4.40	0.2	0.8	0.036	0.381	Invalid
10.	14.77	14.48	4.40	0.7	0.2	0.390	0.381	Valid
11.	16.00	14.48	4.40	0.7	0.2	0.645	0.381	Valid
12.	16.16	14.48	4.40	0.7	0.3	0.712	0.381	Valid
13.	15.86	14.48	4.40	0.6	0.4	0.383	0.381	Valid
14.	15.05	14.48	4.40	0.7	0.3	0.412	0.381	Valid
15.	15.11	14.48	4.40	0.6	0.3	0.398	0.381	Valid
16.	16.33	14.48	4.40	0.6	0.4	0.469	0.381	Valid
17.	16.20	14.48	4.40	0.5	0.5	0.437	0.381	Valid
18.	16.50	14.48	4.40	0.4	0.6	0.397	0.381	Valid
19.	15.05	14.48	4.40	0.7	0.3	0.385	0.381	Valid
20.	16.16	14.48	4.40	0.7	0.3	0.583	0.381	Valid
21.	16.83	14.48	4.40	0.2	0.7	0.385	0.381	Valid
22.	16.18	14.48	4.40	0.6	0.4	0.546	0.381	Valid
23.	15.80	14.48	4.40	0.2	0.8	0.411	0.381	Valid
24.	13.43	14.48	4.40	0.6	0.3	-0.450	0.381	Invalid
25.	16.00	14.48	4.40	0.6	0.3	0.488	0.381	Valid

Appendix 11

Table Validity of Post- Test

Number of Item				P	Q		on 5% significant	Interpretation
1.	19.25	18.08	5.2	0.8	0.2	0.450	0.381	Valid
2.	19.50	18.08	5.2	0.4	0.5	0.244	0.381	Invalid
3.	19.19	18.08	5.2	0.8	0.2	0.426	0.381	Valid
4.	17.85	18.08	5.2	0.5	0.4	-0.049	0.381	Invalid
5.	20.25	18.08	5.2	0.8	0.2	0.834	0.381	Valid
6.	19.09	18.08	5.2	0.9	0.1	0.582	0.381	Valid
7.	14.90	18.08	5.2	0.5	0.5	-0.032	0.381	Invalid
8.	19.63	18.08	5.2	0.9	0.1	0.894	0.381	Valid
9.	19.80	18.08	5.2	0.8	0.2	0.660	0.381	Valid
10.	20.05	18.08	5.2	0.7	0.2	0.706	0.381	Valid
11.	20.13	18.08	5.2	0.9	0.1	1.182	0.381	Valid
12.	20.19	18.08	5.2	0.8	0.1	1.145	0.381	Valid
13.	17.10	18.08	5.2	0.4	0.6	-0.148	0.381	Invalid
14.	19.10	18.08	5.2	0.8	0.2	0.392	0.381	Valid
15.	19.84	18.08	5.2	0.7	0.2	0.632	0.381	Valid
16.	20.50	18.08	5.2	0.8	0.1	0.930	0.381	Valid
17.	19.28	18.08	5.2	0.8	0.2	0.650	0.381	Valid
18.	20.15	18.08	5.2	0.3	0.6	0.796	0.381	Valid
19.	19.33	18.08	5.2	0.3	0.6	0.169	0.381	Invalid
20.	21.00	18.08	5.2	0.8	0.1	0.396	0.381	Valid
21.	20.00	18.08	5.2	0.8	0.1	1.043	0.381	Valid
22.	19.66	18.08	5.2	0.8	0.2	0.856	0.381	Valid
23.	20.50	18.08	5.2	0.8	0.1	0.930	0.381	Valid
24.	18.66	18.08	5.2	0.8	0.1	0.425	0.381	Valid
25.	19.47	18.08	5.2	0.8	0.1	0.755	0.381	Valid

Appendix 9

Validity Post Test

NO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	Xt	Xt²
1	1	0	1	1	0	1	0	1	1	1	1	0	0	1	1	0	1	0	0	0	1	0	0	1	0	10	100
2	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0	0	1	1	1	1	1	21	441
3	1	0	1	0	0	1	0	1	1	0	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	19	361
4	1	1	1	0	1	1	0	1	1	1	1	1	0	0	1	1	1	1	0	0	1	1	1	1	1	19	361
5	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	23	529
6	1	0	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	0	0	1	0	1	1	1	19	361
7	0	0	0	1	0	1	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	8	64
8	1	0	1	0	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	0	1	20	400
9	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	22	484
10	1	0	1	0	1	1	1	1	1	0	1	1	0	1	1	0	0	1	0	0	0	1	0	0	1	14	196
11	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	5	25
12	1	0	0	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	22	484
13	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0	0	1	1	1	1	1	21	441
14	1	1	1	1	1	1	0	1	0	1	0	1	1	1	1	1	1	1	0	0	1	1	1	1	1	20	400
15	1	0	1	0	1	1	0	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1	20	400
16	0	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	21	441
17	1	1	1	1	1	1	0	1	1	1	1	1	0	0	0	1	1	1	0	1	1	1	1	1	1	20	400
18	1	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	1	0	0	1	1	1	1	1	20	400
19	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	1	0	5	25
20	1	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	23	529
21	1	0	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	0	0	1	1	1	1	1	20	400
22	1	0	1	1	1	1	1	1	0	1	1	1	1	0	0	1	1	1	0	0	1	1	1	0	1	18	324
23	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	21	441
24	1	0	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	21	441
25	1	0	1	0	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	20	400
N=25	20	10	21	14	20	22	10	22	20	19	22	21	10	20	19	20	21	20	9	8	21	21	20	21	21	452	8848
P	0.8	0.4	0.8	0.5	0.8	0.9	0.5	0.9	0.8	0.7	0.9	0.8	0.4	0.8	0.7	0.8	0.8	0.8	0.3	0.3	0.8	0.8	0.8	0.8	0.8	∑xt	∑xt²
Q	0.2	0.5	0.2	0.4	0.2	0.2	0.5	0.1	0.2	0.2	0.1	0.1	0.6	0.2	0.2	0.2	0.1	0.2	0.6	0.6	0.1	0.1	0.2	0.1	0.1		

Appendix 13

Reliability Post Test

NO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	Xt	Xt²
1	1	0	1	1	0	1	0	1	1	1	1	0	0	1	1	0	1	0	0	0	1	0	0	1	0	10	100
2	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0	0	1	1	1	1	1	21	441
3	1	0	1	0	0	1	0	1	1	0	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	19	361
4	1	1	1	0	1	1	0	1	1	1	1	1	0	0	1	1	1	1	0	0	1	1	1	1	1	19	361
5	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	23	529
6	1	0	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	0	0	1	0	1	1	1	19	361
7	0	0	0	1	0	1	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	8	64
8	1	0	1	0	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	0	1	20	400
9	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	22	484
10	1	0	1	0	1	1	1	1	1	0	1	1	0	1	1	0	0	1	0	0	0	1	0	0	1	14	196
11	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	5	25
12	1	0	0	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	22	484
13	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0	0	1	1	1	1	1	21	441
14	1	1	1	1	1	1	0	1	0	1	0	1	1	1	1	1	1	1	0	0	1	1	1	1	1	20	400
15	1	0	1	0	1	1	0	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1	20	400
16	0	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	21	441
17	1	1	1	1	1	1	0	1	1	1	1	1	0	0	0	1	1	1	0	1	1	1	1	1	1	20	400
18	1	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	1	0	0	1	1	1	1	1	20	400
19	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	1	0	5	25
20	1	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	23	529
21	1	0	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	0	0	1	1	1	1	1	20	400
22	1	0	1	1	1	1	1	1	0	1	1	1	1	0	0	1	1	1	0	0	1	1	1	0	1	18	324
23	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	21	441
24	1	0	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	21	441
25	1	0	1	0	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	20	400
N=25	20	10	21	14	20	22	10	22	20	19	22	21	10	20	19	20	21	20	9	8	21	21	20	21	21	452	8848
P	0.8	0.4	0.8	0.5	0.8	0.9	0.5	0.9	0.8	0.7	0.9	0.8	0.4	0.8	0.7	0.8	0.8	0.8	0.3	0.3	0.8	0.8	0.8	0.8	0.8	∑xt	∑xt²
Q	0.2	0.5	0.2	0.4	0.2	0.2	0.5	0.1	0.2	0.2	0.1	0.1	0.6	0.2	0.2	0.2	0.1	0.2	0.6	0.6	0.1	0.1	0.2	0.1	0.1		
pq	0.16	0.20	0.16	0.20	0.16	0.18	0.249	0.9	0.16	0.14	0.9	0.8	0.24	0.16	0.14	0.16	0.8	0.16	0.18	0.18	0.8	0.24	0.16	0.8	0.8	3.560	

Appendix 14

Reliability Pre Test

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

R_{11} =

N= 25

$\sum Xt = 362$

$\sum Xt^2 = 5726$

$\sum pq = 5.268$

$S_t^2 = \sum Xt^2 - ^2$

$= 5726 - ^2 = 5726- = 5726 - 5241 = 485$

$S_t^2 = =$

$S_t^2 = 19.40$

R_{11} =

$R_{11} = =$

$= (1.04)\ (0.72)$

$= .0.75$ ($r_{11} > 0.70$ = reliable)

Test is reliable if $r_{count} > r_{tabel}$. Based on calculation above, the test have very high reliable.

Appendix 15

Reliability Post Test

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

R_{11} =

N= 25

$\sum Xt = 452$

$\sum Xt^2 = 8848$

$\sum pq = 3.560$

$S_t^2 = \sum Xt^2 - ^2$

$= 8848 - ^2 = 8848 - = 8848 - 8172 = 676$

$S_t^2 = =$

$S_t^2 = 27.04$

R_{11} =

$R_{11} = =$

$= (1.04)\ (0.\ 86)$

$= 0.89$ ($r_{11} > 0.70$ = reliable)

Test is reliable if $r_{count} > r_{tabel}$. Based on calculation above, the test have very high reliable.

Appendix 16

Score of Experimental Class and Control Class Pre Test

1. Score of Experimental Class Pre Test before using Puzzle

No	The Names of Students	Score	No	The Names of Students	Score
1	Adelina	75	20	Ismardhiah El Lathifah	45
2	Annisa Fitri Harahap	50	21	Jamaluddin	70
3	Ahmad Ridwansyah	45	22	Khoirul Solih Lubis	65
4	Ahmad Rinaldi Bb	60	23	Muhammad Halim	55
5	Anisa Nation	65	24	Nurul Aulya Nasution	65
6	Budi Hidayat Siregar	45	25	Nurpadhilah	55
7	Chikita Rahmadani	75	26	Nur Aisyah Harahap	45
8	Devita Sari Harahap	60	27	Nur Azizah	70
9	Dian Yudama	65	28	Refki Mulia	65
10	Erika Putri Rahayu	50	29	Rodiatul Adawiyah Dlt	70
11	Fadel Muhammad Siregar	60	30	Sayyid Fadhil Fauzan	60
12	Fadhilah Matondang	75	31	Siti Nursyahrina	55
13	Fahrur Rozi harahap	65	32	Sri Muliani Hasanah	65
14	Fani Abbas Faujiah	55	33	Syaikul Izhar	70
15	Febia Nora	55	34	Syukrini Mulyana	50
16	Hasmar Angga Siregar	60	35	Syukurdi	60
17	Ikhsan Harahap	45	36	Wahyuni Malhotra	50
18	Ilham Sahmadi Rangkuti	50	37	Yopi Mardiani	45
19	Irda Malini	65			
Total			**2180**		

2. Score of Control Class Pre Test

No	The Names of Students	Score	No	The Names of Students	Score
1	Aguslan Nasution	50	19	Minaldi Lubis	50
2	Alda Khairunnisa	65	20	Misbah Muniroh	60
3	Andri Ansyah Harahap	60	21	Muhammad Rayhan	55
4	Anggi Arinah Harahap	55	22	Mursaluddin	45
5	Annisa Harahap	45	23	Nanda Muira	55
6	Annisa Putri Rahmayana	65	24	Nurfadhillah	60
7	Arya Ramadhani	50	25	Nurhamijah Putri Btr	70
8	Astri Anggraini	60	26	Paisal Siregar	60
9	Bagus Permadi	45	27	Putri Azhar Sibarani	55
10	Dayinto Azka Faila Sufa	70	28	Rizka Indriani	75
11	Dean Rifky Hidayat	45	29	Rival Rinal	60
12	Fakhrur Rozi	50	30	Roy Didi Muslim	50
13	Husnul Safrina	65	31	Rusdianyah Rambe	
14	Islah Rizki	45	32	Suci Rahmadani	65
15	Luqhyana Nadifa	65	33	Syahna Carnisa	45
16	Marahot Batubara	60	34	Ulfa Muhrijah Harahap	50
17	Mariati Putri	75	35	Yasnia Purba	75
18	Miftahul Jannah	70	36	Yan Kurnia Putra	55
Total			**2090**		

Appendix 17

Score of Experimental Class and Control Class Post Test

1. **Score of Experimental Class Post Test after using Puzzle**

No	The Names of Students	Score	No	The Names of Students	Score
1	Adelina	80	20	Ismardhiah El Lathifah	80
2	Annisa Fitri Harahap	95	21	Jamaluddin	75
3	Ahmad Ridwansyah	95	22	Khoiurul Solih Lubis	75
4	Ahmad Rinaldi Bb	75	23	Muhammad Halim	70
5	Anisa Nation	85	24	Nurul Aulya Nasution	85
6	Budi Hidayat Siregar	65	25	Nurpadhilah	85
7	Chikita Rahmadani	70	26	Nur Aisyah Harahap	90
8	Devita Sari Harahap	75	27	Nur Azizah	90
9	Dian Yudama	80	28	Refki Mulia	75
10	Erika Putri Rahayu	80	29	Rodiatul Adawiyah Dlt	75
11	Fadel Muhammad Siregar	90	30	Sayyid Fadhil Fauzan	80
12	Fadhilah Matondang	80	31	Siti Nursyahrina	65
13	Fahrur Rozi harahap	65	32	Sri Muliani Hasanah	90
14	Fani Abbas Faujiah	80	33	Syaikul Izhar	75
15	Febia Nora	95	34	Syukrini Mulyana	65
16	Hasmar Angga Siregar	65	35	Syukurdi	75
17	Ikhsan Harahap	80	36	Wahyuni Malhotra	90
18	Ilham Sahmadi Rangkuti	65	37	Yopi Mardiani	65
19	Irda Malini	80			
Total			**2895**		

2. Score of Control Class Post Test

No	The Names of Students	Score	No	The Names of Students	Score
1	Aguslan Nasution	60	19	Minaldi Lubis	65
2	Alda Khairunnisa	65	20	Misbah Muniroh	70
3	Andri Ansyah Harahap	70	21	Muhammad Rayhan	60
4	Anggi Arinah Harahap	75	22	Mursaluddin	80
5	Annisa Harahap	80	23	Nanda Muira	65
6	Annisa Putri Rahmayana	55	24	Nurfadhillah	75
7	Arya Ramadhani	55	25	Nurhamijah Putri Btr	55
8	Astri Anggraini	75	26	Paisal Siregar	70
9	Bagus Permadi	65	27	Putri Azhar Sibarani	65
10	Dayinto Azka Faila Sufa	55	28	Rizka Indriani	70
11	Dean Rifky Hidayat	65	29	Rival Rinal	65
12	Fakhrur Rozi	85	30	Roy Didi Muslim	55
13	Husnul Safrina	70	31	Rusdianyah Rambe	85
14	Islah Rizki	80	32	Suci Rahmadani	80
15	Luqhyana Nadifa	70	33	Syahna Carnisa	60
16	Marahot Batubara	75	34	Ulfa Muhrijah Harahap	75
17	Mariati Putri	60	35	Yasnia Purba	60
18	Miftahul Jannah	65	36	Yan Kurnia Putra	85
Total			**2465**		

Appendix 18

RESULT OF NORMALITY TEST IN PRE TEST

RESULT OF THE NORMALITY TEST OF VIII-1 IN PRE-TEST

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

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

2. High = 75

   Low = 45

   Range = High – Low

   = 75 – 45

   = 30

3. Total of Classes = 1 + 3.3 log (n)

   = 1 + 3.3 log (37)

   = 1 + 3.3 (1.56)

   = 1 + 5.14

   = 6.14

   = 7

4. Length of Classes = = = 4.2 = 5
5. Mean

Interval Class	F	X	x’	fx’	x'^2	fx'^2
45 – 49	6	47	4	24	16	96
50 – 54	5	52	3	15	9	45
55 – 59	5	57	2	10	4	20
60 – 64	6	62	1	6	1	6
65 – 69	8	**67**	0	0	0	0
70 – 74	4	72	-1	-4	1	4
75 – 79	3	77	-2	-6	4	12
i = 5	37	-	-	45	-	183

$$Mx = M^{1} + i\frac{\Sigma fx^{1}}{N}$$

$= 67 + 5\ (\ )$

$= 67 + 5\ (1.2)$

$= 67 + (6)$

$= 73$

$$SD_t = i\sqrt{\frac{\Sigma fx'^{2}}{N} - \left[\frac{\Sigma fx'}{N}\right]^{2}}$$

$= ^{2}$

$=$

$=$

$=$

$= 5\ (1.87)$

$= 9.35$

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	f_h	f_0	$\frac{(f_0-f_h)}{f_h}$
75 - 79	79.5	0.69	0.2549				
				0.19	7.03	3	-3.57
70 - 74	74,5	0.16	0.0636				
				-0.29	-10.73	4	-1.37
65 - 69	69,5	-0.37	0.35569				
				0.17	6.29	8	0.27
60 - 64	64,5	-0.90	0.18406				
				0.10	3.7	6	0.62
55 - 59	59,5	-1.44	0.07493				
				0.05	1.85	5	1.70
50 - 54	54,5	-1.97	0.02442				
				0.01	0.37	5	12.5
45 - 49	49,5	-2.51	0.00604				
				0.004	0.14	6	41.8
	44,5	-3.04	0.00118				
						X^2	2.18

Based on table above, reseracher found that $x^2_{count} = 2.18$ while $x^2_{table} = 5.991$ cause $x^2_{cause} < x^2_{table}$ $(2.18 < 5.991)$ with degree of freedom dk = 5 – 3 = 2 and significat level α = 5%. So distribution of VIII-1 class (Pre-test) is normal.

6. Median

No	Interval of Classes	F	Fk
1	45 – 49	6	6
2	50 - 54	5	11
3	55 - 59	5	16
4	60 - 64	6	22
5	**65 - 69**	**8**	30
6	70 - 74	4	34
7	75 - 79	3	37

Position of Me in the interval of classes is number 5, that:

Bb = 64.5

F = 6

fm = 8

i = 5

n = 37

1/2n =18.5

So :

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

$$= 64.5 + 5$$

$$= 64.5 + 5\ (1.56)$$

$$= 64.5 + 7.8$$

$$= 72.3$$

7. Modus

No	Interval of Classes	F	Fk

1	45 – 49	6	6
2	50 - 54	5	11
3	55 - 59	5	16
4	60 - 64	6	22
5	**65 - 69**	**8**	30
6	70 - 74	4	34
7	75 - 79	3	37

M_o =

L = 64.5

d_1 = 2

d_2 = 4

i = 5

M_o = 64.5 +

= 64.5 + 0.3 (5)

= 64.5 + 1.5

= 66

RESULT OF NORMALITY TEST IN PRE TEST

RESULT OF THE NORMALITY TEST OF VIII-2 IN PRE-TEST

1. The score of VIII-2 class in pre test from low score to high score:

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

2. High = 75

   Low = 45

   Range = High – Low

   = 75 – 45

   = 30

3. Total of Classes = 1 + 3.3 log (n)

   = 1 + 3.3 log (36)

   = 1 + 3.3 (1.55)

   = 1 + 5.11

   = 6.11

   = 7

4. Length of Classes = = = 4.2 = 5
5. Mean

Interval Class	F	X	x’	fx’	x’2	fx’2
45 – 49	6	47	3	18	9	54
50 – 54	6	52	2	12	4	24
55 – 59	5	57	1	5	1	5
60 – 64	7	**62**	0	0	0	0
65 – 69	6	67	-1	-6	1	6
70 – 74	3	72	-2	-6	4	12
75 – 79	3	77	-3	-9	9	27
$i = 5$	36	-	-	14	-	128

$$Mx = M^1 + i\frac{\Sigma fx^1}{N}$$

= 62 + 5 ( )

= 62 + 5 (0.38)

= 62 + (1.9)

= 63.9

$SD_t = i\sqrt{\frac{\Sigma fx'^2}{N} - \left[\frac{\Sigma fx'}{N}\right]^2}$

$= ^2$

=

=

=

= 5 (1.84)

= 9.2

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	f_h	f_0	$\frac{(f_0-f_h)}{f_h}$

75 - 79	79.5	1.69	0.4545				
				0.07	2.52	3	0.19
70 - 74	74.5	1.15	0.3749				
				0.14	5.04	3	-0.40
65 - 69	69.5	0.60	0.2257				
				0.20	7.2	6	-0.16
60 - 64	64.5	0.06	0.0239				
				-0.29	-10.4	7	-13.8
55 - 59	59.5	-0.47	0.31918				
				0.16	5.76	5	-0.13
50 - 54	54.5	-1.02	0.15386				
				0.09	3.24	6	0.85
45 - 49	49.5	-1.56	0.05938				
				0.04	1.44	6	3.16
	44.5	-2.10	0.01786				
						X^2	1.44

Based on table above, reseracher found that $x^2_{count} = 1.44$ while $x^2_{table} = 5.991$ cause $x^2_{cause} < x^2_{table}$ $(1.44 < 5.991)$ with degree of freedom dk = 5 – 3 = 2 and significat level α = 5%. So distribution of VIII-2 class (Pre-test) is normal.

6. Median

No	Interval of Classes	F	Fk

1	45 – 49	6	6
2	50 - 54	6	12
3	55 - 59	5	17
4	**60 - 64**	**7**	24
5	65 - 69	6	30
6	70 - 74	3	33
7	75 - 79	3	36

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

Bb = 59.5

F = 5

fm = 7

i = 5

n = 36

1/2n =18

So :

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

$$= 59.5 + 5$$

$$= 59.5 + 5\ (1.85)$$

$$= 59.5 + 9.2$$

$$= 68.7$$

7. Modus

No	Interval of Classes	F	Fk

1	45 – 49	6	2
2	50 - 54	6	5
3	55 - 59	5	9
4	**60 - 64**	**7**	13
5	65 - 69	6	19
6	70 - 74	3	24
7	75 - 79	3	27

M_o =

L = 59.5

d_1 = 2

d_2 = 1

i = 5

M_o = 59.5 +

= 59.5 + 0.6 (5)

= 59.5 + 3

= 62.5

RESULT OF NORMALITY TEST IN PRE TEST

RESULT OF THE NORMALITY TEST OF VIII-3 IN PRE-TEST

1. The score of VIII-3 class in pre test from low score to high score:

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

2. High = 75

   Low = 45

   Range = High – Low

   = 75 – 45

   = 30

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

   = 1 + 3,3 log (35)

   = 1 + 3,3 (1,54)

   = 1 + 5.08

   = 6.08

   = 7

4. Length of Classes = = = 4.2 = 5
5. Mean

Interval Class	F	X	x’	fx’	x’2	fx’2
45 – 49	7	47	4	28	16	112
50 – 54	5	52	3	15	9	45
55 – 59	3	57	2	6	4	12
60 – 64	4	62	1	4	1	4
65 – 69	8	**67**	0	0	0	0
70 – 74	5	72	-1	-5	1	5
75 – 79	3	77	-2	-6	4	12
i = 5	35	-	-	42	-	190

$$Mx = M^1 + i\frac{\Sigma fx^1}{N}$$

= 67 + 5 ( )

= 67 + 5 (1.2)

= 67 + 6

= 73

$SD_t = i\sqrt{\frac{\Sigma fx'^2}{N} - \left[\frac{\Sigma fx'}{N}\right]^2}$

$= ^2$

$=$

$=$

$=$

= 5 (1.99)

= 9.95

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	f_h	f_0	$\frac{(f_0-f_h)}{f_h}$

75 - 79	79.5	0.65	0.2422				
				0.18	6.3	3	-0.52
70 - 74	74.5	0.15	0.0596				
				-0.30	-10.5	5	-16
65 - 69	69.5	-0.35	0.36317				
				0.16	5.6	8	0.42
60 - 64	64.5	-0.85	0.19766				
				0.10	3.5	4	0.14
55 - 59	59.5	-1.35	0.08851				
				0.05	1.75	3	0.71
50 - 54	54.5	-1.85	0.03216				
				0.02	0.7	5	6.14
45 - 49	49.5	-2.36	0.00914				
				0.007	0.24	7	1.18
	44.5	-2.86	0.00212				
						X^2	7.26

Based on table above, reseracher found that x^2_{count} = 7.26 while x^2_{table}=5.991 cause $x^2_{cause} < x^2_{table}$ (7.26 < 5.991) with degree of freedom dk = 5 – 3 = 2 and significat level α = 5%. So distribution of VIII-3 class (Pre-test) is not normal.

6. Median

No	Interval of Classes	F	Fk

1	45 - 49	7	7
2	50 - 54	5	12
3	55 - 59	3	15
4	60 - 64	4	19
5	**65 - 69**	**8**	27
6	70 - 74	5	32
7	75 - 79	3	35

Position of Me in the interval of classes is number 5, that:

Bb = 64.5

F = 4

fm = 8

i = 5

n = 35

1/2n =17.5

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

$= 64.5 + 5$

$= 64.5 + 5\ (1.68)$

$= 64.5 + 8.4$

$= 72.9$

7. Modus

No	Interval of Classes	F	Fk

1	45 – 49	7	7
2	50 - 54	5	12
3	55 - 59	3	15
4	60 - 64	4	19
5	**65 - 69**	**8**	27
6	70 - 74	5	32
7	75 - 79	3	35

M_o =

L = 64.5

d_1 = 4

d_2 = 3

i = 5

M_o = 64.5 +

= 64.5 + 0.57 (5)

= 64.5 + 2.85

= 67.35

Appendix 19

HOMOGENEITY TEST (PRE-TEST)

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

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

Hypotheses:

$H_0 \quad : \delta_1^2 = \delta_2^2$

$H_1 \quad : \delta_1^2 \neq \delta_2^2$

A. Variant of the VIII-1class is:

NO	Xi	Xi^2
1	45	2025
2	45	2025
3	45	2025
4	45	2025
5	45	2025
6	45	2025
7	50	2500
8	50	2500
9	50	2500
10	50	2500
11	50	2500
12	55	3025
13	55	3025
14	55	3025
15	55	3025
16	55	3025
17	60	3600
18	60	3600
19	60	3600
20	60	3600

21	60	3600
22	60	3600
23	65	4225
24	65	4225
25	65	4225
26	65	4255
27	65	4255
28	65	4255
29	65	4255
30	65	4255
31	70	4900
32	70	4900
33	70	4900
34	70	4900
35	75	5625
36	75	5625
37	75	5625
	2180	**131650**

n = 37
= 2180
= 131650

So:

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

$$\frac{37(131650) - (2180)^2}{37(37-1)}$$

$$= \frac{4871050 - 4752400}{37(36)}$$

$$= \frac{118650}{1332}$$

$$= 89.07$$

B. Variant of the VIII-2 class is:

NO	Xi	Xi^2
1	45	2025
2	45	2025
3	45	2025
4	45	2025
5	45	2025
6	45	2025
7	50	2500
8	50	2500
9	50	2500
10	50	2500
11	50	2500
12	50	2500
13	55	3025
14	55	3025
15	55	3025
16	55	3025
17	55	3025
18	60	3600
19	60	3600
20	60	3600
21	60	3600
22	60	3600
23	60	3600
24	60	3600
25	65	4225
26	65	4225
27	65	4225
28	65	4225
29	65	4225
30	65	4225
31	70	4900
32	70	4900
33	70	4900
34	75	5625
35	75	5625
36	75	5625
	2090	**124400**

n = 36
= 2090
= 124400

So:

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

$$= \frac{36(124400) - (2090)^2}{36(36-1)}$$

$$= \frac{4478400 - 4368100}{36(35)}$$

$$= \frac{110300}{1260}$$

$$= 87.53$$

C. Variant of the VIII- 3 class is:

NO	Xi	Xi^2
1	45	2025
2	45	2025
3	45	2025
4	45	2025
5	45	2025
6	45	2025
7	45	2025
8	50	2500
9	50	2500
10	50	2500
11	50	2500
12	50	2500
13	55	3025
14	55	3025
15	55	3025
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	65	4225
26	65	4225
27	65	4225
28	70	4900
29	70	4900
30	70	4900
31	70	4900
32	70	4900
33	75	5625
34	75	5625
35	75	5625
	2065	**125325**

n = 35
= 2065
= 125325

So:

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

$$\frac{35(125325) - (2065)^2}{35(35-1)}$$

$$= \frac{4386375 - 4264225}{35(34)}$$

$$= \frac{122150}{1190}$$

$$= 85.41$$

The Formula was used to test hypothesis was:

1. VIII-1 and VIII -2 :

   F =

   So:

   $$F = \frac{89.07}{87.53}$$

   = 1.01

   After doing the calculation, researcher found that F_{count} = 1.01 with α 5 % and dk = 37 from the distribution list F, researcher found that F_{table} = 2.042, cause $F_{count} < F_{table}$ (1.01< 2.042). So, there is no difference the variant between the VIII-1 class and VIII-2 class. It means that the variant is homogenous**.**

2. VIII -1 and VIII -3 :

   F =

   So:

   $$F = \frac{89.07}{85.41}$$

   = 1.04

   After doing the calculation, researcher found that F_{count} = 1.04 with α 5 % and dk = 37 from the distribution list F, researcher found that F_{table} = 2.042, cause $F_{count} < F_{table}$ (1.04 < 2.042). So, there is no difference the variant between the VIII-1 class and VIII-3 class. It means that the variant is homogenous**.**

3. VIII -2 and VIII - 3 :

F =

So:

$$F = \frac{87.53}{85.41}$$

$$= 1.02$$

After doing the calculation, researcher found that $F_{count} = 1.02$ with α 5 % and dk = 37 and 35 from the distribution list F, researcher found that $F_{table} = 2.042$, cause $F_{count} < F_{table}$ (1.02 < 2.042). So, there is no difference the variant between the VIII-2 class and VIII-3 class. It means that the variant is homogenous**.**

Appendix 20

RESULT OF THE NORMALITY TEST OF EXPERIMENT CLASS IN POST-TEST

1. The score of experiment class in post test from low score to high score:

65	65	65	65	65	65	65	65	70	70
75	75	75	75	75	75	75	80	80	80
80	80	80	80	80	80	85	85	85	90
90	90	90	90	95	95	95			

2. High = 95

   Low = 65

   Range = High – Low

   = 95 – 65

   = 30

3. Total of Classes = 1 + 3.3 log (n)

   = 1 + 3.3 log (37)

   = 1 + 3.3 (1.56)

   = 1 + 5.14

   = 6.14

   = 7

4. Length of Classes = = = 4.2 = 5
5. Mean

Interval Class	F	X	x’	fx’	x’2	fx’2
65 – 69	8	67	3	24	9	72
70 – 74	2	72	2	4	4	8
75 – 79	7	77	1	7	1	7
80 – 84	9	**82**	0	0	0	0
85 – 89	3	87	-1	-3	1	3
90 – 94	5	92	-2	-10	4	20
95 – 99	3	97	-3	-9	9	27
$i = 5$	37	-		13		137

$$Mx = M^1 + i\frac{\Sigma fx^1}{N}$$

= 82 + 5 ( )

= 82 + 5 (0.35)

= 82 + (1.75)

= 83.75

$SD_t = i\sqrt{\frac{\Sigma fx'^2}{N} - \left[\frac{\Sigma fx'}{N}\right]^2}$

= 2

=

=

=

= 5 (1.89)

= 9.45

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	f_h	f_0	$\frac{(f_0-f_h)}{f_h}$

95 – 99	99.5	1.66	0.4515	0.08	2.96	3	0.01
90 – 94	94.5	1.13	0.3708	0.14	5.18	5	-0.03
85 – 89	89.5	0.60	0.2257	0.19	7.03	3	-0.57
80 – 84	84.5	0.07	0.0279	-0.30	-11.1	9	-1.81
75 – 79	79.5	-0.44	0.32997	0.16	5.92	7	0.18
70 – 74	74.5	-0.97	0.16602	0.09	3.33	2	-0.39
65 – 69	69.5	-1.50	0.06681	0.04	1.48	8	4.40
	64.5	-2.03	0.02118				
						X^2	2.42

Based on table above,reseracher found that $x^2_{count} = 2.42$ while $x^2_{table} = 5.991$ cause $x^2_{cause} < x^2_{table}$ (2.42 <5.991) with degree of freedom dk = 5 – 3 = 2 and significat level α = 5%. So distribution of experiment class (Post Test) was normal.

6. Median

No	Interval of Classes	F	Fk

1	65 – 69	8	8
2	70 - 74	2	10
3	75 - 79	7	17
4	80 - 84	**9**	26
5	85 - 89	3	29
6	90 - 94	5	34
7	95 - 99	3	37

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

Bb = 79.5

F = 7

fm = 9

i = 5

n = 37

1/2n =18.5

So :

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

$$= 79.5 + 5$$

$$= 79.5 + 5\ (1.27)$$

$$= 79.5 + 6.35$$

$$= 85.85$$

7. Modus

No	Interval of Classes	F	fk

1	65 – 69	8	8
2	70 - 74	2	10
3	75 - 79	7	17
4	80 - 84	**9**	26
5	85 - 89	3	29
6	90 - 94	5	34
7	95 - 99	3	37

M_o =

L = 79.5

d_1 = 2

d_2 = 6

i = 5

M_o = 79.5 +

= 79.5 + 0.25 (5)

= 79.5 + 1.25

= 80.75

Appendix 21

RESULT OF THE NORMALITY TEST OF CONTROL CLASS IN POST TEST

1. The score of control class in post test from low score to high score:

55	55	55	55	55	60	60	60	60	60
65	65	65	65	65	65	65	65	70	70
70	70	70	70	75	75	75	75	75	80
80	80	80	85	85	85				

2. High = 85

   Low = 55

   Range = High – Low
   = 85 – 55
   = 30

3. Total of Classes = 1 + 3.3 log (n)
   = 1 + 3.3 log (36)
   = 1 + 3.3 (1.55)
   = 1 + 5.11
   = 6.11
   = 7

4. Length of Classes = = = 4.2 = 5

5. Mean

Interval Class	F	X	x’	fx’	x’2	fx’2
55 – 59	5	57	2	10	4	20
60 – 64	5	62	1	1	1	5
65 – 69	8	**67**	0	0	0	0
70 – 74	6	72	-1	-6	1	6
75 – 79	5	77	-2	-5	4	20
80 – 84	4	82	-3	-12	9	36
85 – 89	3	87	-4	-12	16	48
i =5	36	-	-	-24	-	135

$$Mx = M^1 + i\frac{\Sigma fx^1}{N}$$

= 67 + 5 ( )

= 67 + 5 (-0.66)

= 67 + (-3.3)

= 63.7

$SD_t = i \sqrt{\frac{\Sigma fx'^2}{N} - \left[\frac{\Sigma fx'}{N}\right]^2}$

$= ^2$

=

=

=

= 5 (1.82)

= 9.1

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	f_h	f_0	$\frac{(f_0-f_h)}{f_h}$

85 - 89	89.5	2.83	0.4977				
				0.09	13.9	3	1.78
80 - 84	84.5	2.28	0.4887				
				0.03	1.08	4	2.70
75 - 79	79.5	1.73	0.4582				
				0.07	2.52	5	-0.98
70 - 74	74.5	1.18	0.3810				
				0.14	5.04	6	0.19
65 - 69	69.5	0.63	0.2357				
				0.20	7.2	8	0.11
60 - 64	64.5	0.08	0.0319				
				-0.29	-10.44	5	-1.47
55 - 59	59.5	-0.46	0.32276				
				0.16	5.76	5	-0.13
	54.5	-1.01	0.15625				
						X^2	3.40

Based on table above,reseracher found that $x^2_{count} = 3.40$ while $x^2_{table} = 5.991$cause $x^2_{cause} < x^2_{table}$ (3.40 <5.991) with degree of freedom dk = 5 – 3 = 2 and significat level α = 5%. So distribution of control class (Post-test) was normal.

6. Median

No	Interval Class	F	fk
1	55 – 59	5	5
2	60 - 64	5	10
3	65 - 69	**8**	18
4	70 - 74	6	24
5	75 - 79	5	29
6	80 - 84	4	33
7	85 – 89	3	36

Position of Me in the interval of classes is number 2, that:

Bb = 64.5

F = 5

fm = 8

i = 5

n = 36

1/2n =18

So :

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

$$= 64.5 + 5$$

$$= 64.5 + 5\ (1.6)$$

$$= 64.5 + 8$$

$$= 72.5$$

7. Modus

No	Interval Class	F	fk
1	55 – 59	5	5
2	60 - 64	5	10
3	65 - 69	**8**	18
4	70 - 74	6	24
5	75 - 79	5	29
6	80 - 84	4	33
7	85 – 89	3	36

M_o =

L = 64.5

d_1 = 3

d_2 = 2

i = 5

M_o = 64.5 +

= 64.5 + 0.6 (5)

= 64.5 + 3

= 67.5

Appendix 22

HOMOGENEITY TEST (POST TEST)

1. EXPERIMENT CLASS

NO	Xi	Xi^2
1	65	4225
2	65	4225
3	65	4225
4	65	4225
5	65	4225
6	65	4225
7	65	4225
8	65	4225
9	70	4900
10	70	4900
11	75	5625
12	75	5625
13	75	5625
14	75	5625
15	75	5625
16	75	5625
17	75	5625
18	80	6400
19	80	6400
20	80	6400
21	80	6400
22	80	6400
23	80	6400
24	80	6400
25	80	6400
26	80	6400
27	85	7225
28	85	7225
29	85	7225
30	90	8100
31	90	8100
32	90	8100
33	90	8100
34	90	8100

35	95	9025
36	95	9025
37	95	9025
	2895	**229825**

n = 37
= 2895
= 229825

So:

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

$$= \frac{37(229825) - (2895)^2}{37(37-1)}$$

$$= \frac{8503525 - 8381025}{37(36)}$$

$$= \frac{122500}{1332}$$

$$= 91.96$$

2. CONTROL CLASS

NO	Xi	Xi^2
1	55	3025
2	55	3025
3	55	3025
4	55	3025
5	55	3025
6	60	3600
7	60	3600
8	60	3600
9	60	3600
10	60	3600
11	65	4225
12	65	4225
13	65	4225
14	65	4225
15	65	4225
16	65	4225
17	65	4225
18	65	4225
19	70	4900
20	70	4900
21	70	4900
22	70	4900
23	70	4900
24	70	4900
25	75	5625
26	75	5625
27	75	5625
28	75	5625
29	75	5625
30	80	6400
31	80	6400
32	80	6400
33	80	6400
34	85	7225
35	85	7225
36	85	7225
	2465	**171725**

n = 36
= 2465
= 171725

So:

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

$$= \frac{36(171725) - (2465)^2}{36(36-1)}$$

$$= \frac{6182100 - 6076225}{36(35)}$$

$$= \frac{105875}{1260}$$

$$= 84.02$$

The Formula was used to test hypothesis was:

1. VIII-1 and VIII-2 :

F =

So:

$$F = \frac{91.96}{84.02}$$

= 1.09

After doing the calculation, researcher found that F_{count} = 1.09 with α 5 % and dk = 37 & 36 from the distribution list F, researcher found that F_{table} = 2.042, cause $F_{count} < F_{table}$ (1.09 < 2.042). So, there is no difference the variant between the VIII-1 class and VIII-2 class. It means that the variant is homogenous.

Appendix 23

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:

$$t = \frac{\overline{X}_1 - \overline{X}_2}{\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \text{ with } S = \sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 2)S_2^2}{n_1 + n_2 - 2}}$$

So:

S =

=

=

=

=

= 9.33

So:

$$t = \frac{\overline{X}_1 - \overline{X}_2}{\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

t =

=

=

=

= 1.80

Based on researcher calculation result of the homogeneity test of the both averages, researcher found that t_{count}= 1.80 with opportunity (1- α) = 1 – 5% = 95% and dk = n_1 + n_2 -2 = 37 + 36 – 2 = 71, reseracher found that t_{table} = 2.000, cause t_{count}< t_{table}(1.80 < 2.000). So, H_a was 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.

Appendix 24

T_{test}OF THE BOTH AVERAGES IN POST-TEST

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

$$t = \frac{\overline{X}_1 - \overline{X}_2}{\sqrt[5]{\frac{1}{n_1} + \frac{1}{n_2}}} \text{ with } S = \sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 2)S_2^2}{n_1 + n_2 - 2}}$$

So:

S =

=

=

=

=

= 9.31

So:

$$t = \frac{\overline{X}_1 - \overline{X}_2}{\sqrt[5]{\frac{1}{n_1} + \frac{1}{n_2}}}$$

t =

=

=

=

= 39.94

Based on researcher calculation result of the homogeneity test of the both averages, researcher found that t_{count}= 39.94 with opportunity (1- α) = 1 – 5% = 95% and dk = n_1 + n_2 -2 = 37 + 36 – 2 = 71, reseracher found that t_{table} = 2.000, cause t_{count}> t_{table}(39.94 > 2.000). So, H_a 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.

APPENDIX 25

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
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

APPENDIX 26

Z-Table

Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
-3.9	0.00005	0.00005	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004	0.00003	0.00003
-3.8	0.00007	0.00007	0.00007	0.00006	0.00006	0.00006	0.00006	0.00005	0.00005	0.00005
-3.7	0.00011	0.00010	0.00010	0.00010	0.00009	0.00009	0.00008	0.00008	0.00008	0.00008
-3.6	0.00016	0.00015	0.00015	0.00014	0.00014	0.00013	0.00013	0.00012	0.00012	0.00011
-3.5	0.00023	0.00022	0.00022	0.00021	0.00020	0.00019	0.00019	0.00018	0.00017	0.00017
-3.4	0.00034	0.00032	0.00031	0.00030	0.00029	0.00028	0.00027	0.00026	0.00025	0.00024
-3.3	0.00048	0.00047	0.00045	0.00043	0.00042	0.00040	0.00039	0.00038	0.00036	0.00035
-3.2	0.00069	0.00066	0.00064	0.00062	0.00060	0.00058	0.00056	0.00054	0.00052	0.00050
-3.1	0.00097	0.00094	0.00090	0.00087	0.00084	0.00082	0.00079	0.00076	0.00074	0.00071
-3.0	0.00135	0.00131	0.00126	0.00122	0.00118	0.00114	0.00111	0.00107	0.00104	0.00100
-2.9	0.00187	0.00181	0.00175	0.00169	0.00164	0.00159	0.00154	0.00149	0.00144	0.00139
-2.8	0.00256	0.00248	0.00240	0.00233	0.00226	0.00219	0.00212	0.00205	0.00199	0.00193
-2.7	0.00347	0.00336	0.00326	0.00317	0.00307	0.00298	0.00289	0.00280	0.00272	0.00264
-2.6	0.00466	0.00453	0.00440	0.00427	0.00415	0.00402	0.00391	0.00379	0.03680	0.00357
-2.5	0.00621	0.00604	0.00587	0.00570	0.00554	0.00539	0.00523	0.00508	0.00494	0.00480
-2.4	0.00820	0.00798	0.00776	0.00755	0.00734	0.00714	0.00695	0.00676	0.00657	0.00639
-2.3	0.01072	0.01044	0.01017	0.00990	0.00964	0.00939	0.00914	0.00889	0.00866	0.00842
-2.2	0.01390	0.01355	0.01321	0.01287	0.01255	0.01222	0.01191	0.01160	0.01130	0.01101
-2.1	0.01786	0.01743	0.01700	0.01659	0.01618	0.01578	0.01539	0.01500	0.01463	0.01426
-2.0	0.02275	0.02222	0.02169	0.02118	0.02068	0.02018	0.01970	0.01923	0.01876	0.01831
-1.9	0.02872	0.02807	0.02743	0.02680	0.02619	0.02559	0.02500	0.02442	0.02385	0.02330
-1.8	0.03593	0.03515	0.03438	0.03362	0.03288	0.03216	0.03144	0.03074	0.03005	0.02938
-1.7	0.04457	0.04363	0.04272	0.04182	0.04093	0.04006	0.03920	0.03836	0.03754	0.03673
-1.6	0.05480	0.05370	0.05262	0.05155	0.05050	0.04947	0.04846	0.04746	0.04648	0.04551

-1.5	0.06681	0.06552	0.06426	0.06301	0.06178	0.06057	0.05938	0.05821	0.05705	0.05592
-1.4	0.08076	0.07927	0.07780	0.07636	0.07493	0.07353	0.07215	0.07078	0.06944	0.06811
-1.3	0.09680	0.09510	0.09342	0.09176	0.09012	0.08851	0.08691	0.08534	0.08379	0.08226
-1.2	0.11507	0.11314	0.11123	0.10935	0.10749	0.10565	0.10383	0.10204	0.10027	0.09853
-1.1	0.13567	0.13350	0.13136	0.12924	0.12714	0.12507	0.12302	0.12100	0.11900	0.11702
-1.0	0.15866	0.15625	0.15386	0.15151	0.14917	0.14686	0.14457	0.14231	0.14007	0.13786
-0.9	0.18406	0.18141	0.17879	0.17619	0.17361	0.17106	0.16853	0.16602	0.16354	0.16109
-0.8	0.21186	0.20897	0.20611	0.20327	0.20045	0.19766	0.19489	0.19215	0.18943	0.18673
-0.7	0.24196	0.23885	0.23576	0.23270	0.22965	0.22663	0.22363	0.22065	0.21770	0.21476
-0.6	0.27425	0.27093	0.26763	0.26435	0.26109	0.25785	0.25463	0.25143	0.24825	0.24510
-0.5	0.30854	0.30503	0.30153	0.29806	0.29460	0.29116	0.28774	0.28434	0.28096	0.27760
-0.4	0.34458	0.34090	0.33724	0.33360	0.32997	0.32636	0.32276	0.31918	0.31561	0.31207
-0.3	0.38209	0.37828	0.37448	0.37070	0.36693	0.36317	0.35942	0.35569	0.35197	0.34827
-0.2	0.42074	0.41683	0.41294	0.40905	0.40517	0.40129	0.39743	0.39358	0.38974	0.38591
-0.1	0.46017	0.45620	0.45224	0.44828	0.44433	0.44038	0.43644	0.43251	0.42858	0.42465
-0.0	0.50000	0.49601	0.49202	0.48803	0.48405	0.48006	0.47608	0.47210	0.46812	0.46414

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
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
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

APPENDIX 27

Percentage Points of the t Distribution

Two Tail Test						
	0.50	**0.20**	**0.10**	**0.05**	**0.02**	**0.01**
One Tail Test						
dk	**0.25**	**0.10**	**0.005**	**0.025**	**0.01**	**0.05**
1	1.000	3.078	6.314	12.706	31.821	63.657
2	0.816	1.886	2.920	4.303	6.965	9.925
3	0.765	1.638	2.353	3.182	4.541	5.841
4	0.741	1.533	2.132	2.776	3.747	4.604
5	0.721	1.486	2.015	2.571	3.365	4.032
6	0.718	1.440	1.943	2.447	3.143	3.707
7	0.711	1.415	1.895	2.365	2.998	3.499
8	0.706	1.397	1.860	2.306	2.896	3.355
9	0.703	1.383	1.833	2.262	2.821	3.250
10	0.700	1.372	1.812	2.228	2.764	3.165
11	0.697	1.363	1.796	2.201	2.718	3.106
12	0.695	1.356	1.782	2.178	2.681	3.055
13	0.692	1.350	1.771	2.160	2.650	3.012
14	0.691	1.345	1.761	2.145	2.624	2.977
15	0.690	1.341	1.753	2.132	2.623	2.947
16	0.689	1.337	1.746	2.120	2.583	2.921
17	0.688	1.333	1.743	2.110	2.567	2.898
18	0.688	1.330	1.740	2.101	2.552	2.878
19	0.687	1.328	1.729	2.093	2.539	2.861
20	0.687	1.325	1.725	2.086	2.528	2.845
21	0.686	1.323	1.721	2.080	2.518	2.831
22	0.686	1.321	1.717	2.074	2.508	2.819
23	0.685	1.319	1.714	2.069	2.500	2.807
24	0.685	1.318	1.711	2.064	2.492	2.797
25	0.684	1.316	1.708	2.060	2.485	2.787
26	0.684	1.315	1.706	2.056	2.479	2.779
27	0.684	1.314	1.703	2.052	2.473	2.771
28	0.683	1.313	1.701	2.048	2.467	2.763
29	0.683	1.311	1.699	2.045	2.462	2.756
30	0.683	1.310	1.697	**2.042**	2.457	2.750
40	0.681	1.303	1.684	2.021	2.423	2.704
60	0.679	1.296	1.671	**2.000**	2.390	2.660
120	0.677	1.289	1.658	1.980	2.358	2.617
∞	0.674	1.282	1.645	1.960	2.326	2.576

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