Innovative Design and Fabrication of a Machine for Destroying Dry Waste

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ABSTRACT

The dry waste material is type of waste material, waste materials like solid waste, liquid waste in atmosphere leads to unhygienic situation which affects human health and chances of disease increases. In our project by burning the dry waste material we are trying to control the waste materials in atmosphere. By using heating coil we are going to burn the dry waste material and in this way we are eliminating the dry waste materials, the ash which will going to be formed after burning the dry waste material can be used in construction work, in making roads walls..

Keywords: Dry waste material, Heating coil, Solar plate, Disposing, Management, Waste, Landfill, Incineration etc.

I.   INTRODUCTION

Wastes are unwanted or unusable materials. Waste is any substance which is discarded after primary use, or it is worthless, defective and of no use.
Examples include municipal solid waste, hazardous waste, radioactive waste and others

Americans alone are responsible for producing a hopping 220 million tons of waste a year. This number is far more than any other nation in the world. Because of this fact both the government and environmental associations have developed numerous method of dealing with the problem. Waste management is the solution, a rather complex issue that encompasses more than 20 different industries. Waste management is collection, transportation, and disposal of garbage, sewage and other waste products.

As the government and societies are applying effort towards waste material management our team has decided to make project regarding this topic, In our project we are going to burn dry waste material by using heating coil, in our project we are going to use solar plates to get energy from sun and this energy will be stored in batteries and this energy will be used to operate the heating coil, above the heating coil there will the base plate on which dry waste material will be kept for burning.

Although there are many methods available to dispose off waste, like Landfills, Incineration/Combustion, Recovery and Recycling, Plasma glasification etc.

Incineration or Combustion is a disposal method in which municipal solid wastes are burned at high temperature so as to convert them into residue and gaseous product. The biggest advantage of this type of method is that it can reduce the volume of solid waste to 20 to 30 percent of the original volume, decreases the space they take up and reduce the stress on landfills.

This process is also known as thermal treatment where solid waste materials are converted by incinerators into heat, gas, steam and ash.

1.1 Burning Waste Material

Dry waste material is going to burn by using heating coil, a heating coil or heating elementconverts electricity into heat through the process of resistive or joule heating. Electric current passes through the element encounters resistance, resulting in heating of the element. Unlike the peltier effect, this process is independent of the direction of current flow, as the heating coil will get heated the base plate temperature will increase as the base plate is placed above the coil and in this way the dry waste material will get burned which is placed on the base material.

Incineration is a waste treatment process that involves thecombustion of organic substances contained in waste materials. Incineration and other high temperature waste treatment systems are described as thermal treatment. Incineration of waste materials converts the waste into ash, flue gas and heat. The ash is mostly formed by the inorganic constituents of the waste, and may take the form of solid lumps or particulates carried by the flue gas.

The flue gases must be cleaned of gaseous and particulate pollutants before they are dispersed into the atmosphere. In some cases, the heat generated by incineration can be used to generate electric power.

1.2 Literature Review

The abysmal state of and challenges in municipal solid waste management (MSWM) in urban India is the motivation of the present study. Urbanization contributes enhanced municipal solid waste (MSW) generation and unscientific handling of MSW degrades the urban environment and causes health hazards.

Energy comes in different forms. Light is a form of energy. So is heat. So is electricity. Often, one form of energy can be turned into another. This fact is very important because it explains how we get electricity, which we use in so many ways. Electricity s used to light streets and buildings, to run computers and TVs, and to run many other machines and appliances at home, at school, and at work.

At present, the generation of huge amount of solid wastes has become a growing case of concern in urban areas. The city of Guwahati is also facing a serious threat to its eco-friendly atmosphere due to the prevailing scenario of gradually increasinglevel of solid waste generation trend. A study was conducted to assess the seasonal variation in the quantity of generated municipal solid waste in Guwahati city. It revealed that food and vegetable waste is generated in higher quantity in Guwahati city than other components of solid wastes. Variation occurs in the type, nature and quantity of municipal solid wastes generated at different period of time in a year depending upon the seasonal and environmental impacts. Moreover, the amount of solid waste generation generally increases during festivals, fairs. Social and family parties and other special occasions.

II. CONCLUSIONS

In this project the heat is generated by using heating coil and this heat is used to burn the dry waste material, the dry waste material is passed through hopper on the base plate, the base plate is present on the coil, and as the coil heated by obtaining the current from the battery the base plate temperature increases and in this way the dry waste material in burning and the ash which is collecting after the burning process is going to be used in construction work.

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Language Acquisition in Early Childhood: How Four- and Five-Year-Olds Learn English Sentences

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Abstract: The objectives of this research were to find out types of English sentences acquired by boys and girls of four and five years old children. This research also aims to find the tendency of English acquisition between boys and girls. The sources or subjects of this research were 20 kindergarten students of K-2 David in TK Kristen Kalam Kudus Pematangsiantar, 11 boys and 9 girls. The research design is qualitative research design. The instrument of data collection used video recording to observe the subjects in real situation and naturally. The result reveals that, the types of English sentences acquired by boys and girls of four and five years old children are declarative, interrogative, imperative, and exclamatory sentences, which are boys acquired interrogative sentences much more in their conversation while girls acquired declarative sentences more than other types. Girls or females articulate better and acquire a more extensive vocabulary than males or boys.

Keywords: *language acquisition, children of four and five, types of sentences*

INTRODUCTION

Childhood is the golden age for creating simultaneous bilingual children due to the plasticity and virginity of the child's brain to make for superior ability specifically in acquiring the early sets or units of language' (Lightbown and Spada 1999: 29). The English language is considered as a universal language, mainly because it is the most spoken language worldwide. English is also one of the most studied languages all across the world, most of the countries teach it as a second language from primary school. Language acquisition can be defined as the study of the process of children in acquiring language. First language acquisition studied infants' acquisition of their native language (mother tongue), whereas second language acquisition (SLA) deals with acquisition of additional language.

English is not our native language. It is such a foreign language for Indonesian people. But, as an international language or one of spoken worldwide language, it is taught since childhood in many schools. Worldwide we see that most of the communication sources, information and material sold or given to us are in English, for example: films, TV shows, music, documentaries, popular brands, etc. Introducing English to young learners will help them increase their knowledge and communication skill earlier. M. Verspoor and K. Sauter (2000) stated that English sentences can be classified according to communicative functions and patterns into four basic finds: Declarative, Interrogative, Imperative and Exclamatory sentence patterns, they added that when people communicate, they communicate for various reasons, but the four main reasons are:
- To inform someone of something
- To get information from someone
- To get someone to do something
- To express one's attitude about something.

English language acquisition can be defined as the process of learning and understanding the English language. English acquisition usually happens to the children whose native language is English. But it also can be happened to the children whose native language is not English but they are exposed to the English language since early age.

Lyons (1970:10) says that, syntax is the study of rules for combining words into a sentence. Wasow (1999) says that, syntax refers only to the ways in which words combine into phrases and phrase into sentences the form or structure of well formed expressions. Syntax is also the study which includes the way in which words and supra segmental morphemes are arranged to each other in utterances. Meanwhile, Johnson (2007) says that syntax can be described as that subdiscipline of linguistics which seeks to discover what speakers know about how to arrange the words of their language into meaningful sentences.

Dardjowidjojo (2000), in his finding about Echa's syntax acquisition described that "… *Perkembangan sintaksis anak melaju sangat pesat segera setelah ujaran dua kata dilaluinya…" Echa telah menguasai tiga macam kalimat secara lebih baik; kalimat deklaratif, kalimat imperative, dan kalimat interogatif, seperti; [mmb li tsusu ultla ya b sa]= "membeli susu ultra yang besar"; [gak masih banya?, masih ts dikit]= "ngak masih banyak, masih sedikit"; [t lo bukain]= "tolong bukain"; [aku mau pl s tan disitu/ boleh?]= "aku mau perosotan disitu/ boleh?"*

The way children acquire language follows a specific pattern and is inherently systemic in nature. Children between the age of 2 and 6 acquire language so rapidly that by 6 they are competent language users. By the time children are of school-age, they have amazing language ability; it is seemingly effortless acquisition (Cole & Cole, 1993; Curtiss, 1977; Goldin-Meadow, 1982; Lindfors, 1991; McLaughlin, 1984; Newport, 1991).

Children can see gender distinctions everywhere and start following gender imposed patterns of behavior very early, thus continuing to learn to be a girl or a boy. As for linguistic aspects, there is enough evidence to claim that girls are usually more advanced in language development than boys (it is obvious, though, that individual differences exist). Girls begin to talk earlier; they articulate better and acquire a more extensive vocabulary than boys of the same age. Studies of verbal ability have shown that girls and women surpass boys and men in verbal fluency, correct language usage, sentence complexity, grammatical structure, spelling, and articulation (Karmiloff, 2002).

The statement above tells about the course of language development at an early stage. It means that for the boys might be more difficult to grasp and acquire the structure of their mother tongue. Extensive research in the field allows us to state, however, that even though in some aspects of language acquisition boys might be considered to lag behind or experience more difficulties than girls, they, as a rule, reach the same level of linguistic competence as girls already during the preschool years.

That's why this research comes up. What types of English sentences do boys and girls acquire? This research deals with the acquisition of English sentences of young children between four and five years old kindergarten students. The researcher also wants to investigate the tendency of boys and girls in acquiring those sentences.

In this study, the writer only focuses on the English sentences acquisition by the kindergarten children based on gender perspective. The types of English sentences analyzed are limited on declarative, interrogative, imperative, and exclamatory sentence. Greenbaum and Nelson (2002) listed the four types of sentences that are associated with four major uses in communication:

1. Declarative Sentences

The declarative sentence is a sentence in which something is stated or told. Verspoor and Sauter (2002: 18) stated that when people communicate, they do so for various reasons, one of them is to inform someone of something. This communicative function has a typical sentence pattern:

    e.g. - The students are studying
      - Paul gave her a present

  This pattern has the following syntactic characteristic: Subject whole verb. This sentence type with this pattern is named as *declarative*. The sentences which are informative have the declarative sentence pattern.

2. Interrogative Sentences

According to Greenbaum and Nelson (2002), there are two main types of interrogative sentence:

  a) *Yes–no questions* begin with a verb. They require subject–operator inversion; that is, a reversal of the order of subject and verb (the order that is normal in declaratives). The verb that appears before the subject is an operator:

  Should (op) the government (S) cut income taxes?
  Does (op) this shop (S) open 24 hours every day?

They are called yes–no questions because they expect the answer yes or no. They may in fact be answered in other ways; for example, *Certainly; Perhaps; I don't know; What do you think?*

  b) *Wh-questions* begin with an interrogative word or phrase:

  Why should the government cut income taxes?
  On which days does this shop open 24 hours?

They are called wh-questions because most of the interrogative words begin with wh-(the exception is *how*). The interrogative phrases contain an interrogative word such as which in *On which days*. The interrogative word in wh-questions represents a missing piece of information that the speaker wants the hearer to supply.

3. Imperative Sentences

According to Greenbaum and Nelson (2002), imperative sentences usually do not have a subject. If there is no auxiliary, the verb has the base form:

  Take a seat.
  Pass me the bottle.
  Make me an offer.

Modal auxiliaries do not occur with imperatives, and the only auxiliary that occurs with any frequency is passive be (usually in the negative):

  Don't be carried away with the idea.

The pronoun you may be added as a second person subject:

  You make me an offer.

Occasionally, a third person subject is used:

  Somebody make me an offer.
  Those in the front row sit down.

First and third person imperatives may be formed with let and a subject:

>*Let us go now.*
>*Let's not tell him.*
>*Don't let's talk about it.*
>*Let me think what I should do.*
>*Let nobody move.*

4. Exclamatory Sentences

Exclamatory begin with what or how. What introduces noun phrases; how is used for all other purposes. The exclamatory word or (more commonly) phrase is fronted:

>*What* a good show it was! ('It was an extremely good show.')
>*What* a time we've had!
>*How* hard she works!
>*How* strange they look!
>*How* time flies! ('Time flies extremely fast')

Exclamatory sentences express strong feeling. More specifically, they indicate the extent to which the speaker is impressed by something. What and how are intensifiers expressing a high degree.

Children begin to form concepts of gender beginning around age 2, and most children know if they are a boy or girl by the age of 3 (Martin & Ruble, 2004). Between the ages of 3 and 5 years, children develop their gender identity and begin to understand what it means to be male or female. Almost immediately after becoming gender aware, children begin developing stereotypes, which they apply to themselves and others, in an attempt to give meaning to and gain understanding about their own identity. Girls and boys develop neither at the same biological rate nor at the same cognitive rate. Since girls generally develop earlier than boys, researchers often attribute their superior early reading skills in part to this biological factor (Halpern, 2006). The ability to learn and use language contains a female advantage from as early as during the first two years of life.

Here is a transcript containing a fragment of a conversation in the classroom of kindergarten B that the researcher observed in the morning, on Tuesday, October 17th, 2016:

Teacher : *"Do you still remember our bible story children?"*
Children : *"Yes, ms."*
Melodie : *"about Zaccheus"*
Teacher : *"Ok. What happened to Zaccheus?"*
Brigita : *"He is short and he climb the tree to see Jesus."*
Charly : *"He has no friend."*
Teacher : *"Then what Jesus said to Zaccheus?"*
Bezaleel : *"Come down."*
Melodie : *"Zaccheus come down. I want to stay in your house. Then they go to Zaccheus house."*

Based on the phenomenon above, we can see that whether boys and girls have capability in acquiring different kinds of sentences of English language. We can see also that girls (Melodie and Brigita) used a good verbal fluency in explaining something while boys (Charly and Bezaleel) tend to simplify and comprehend their understanding. This research wants to find out the types of English sentences acquiring by four and five years old children. This research also wants to find out the dominant types of sentences that boys and girls used in their

interactions; will girls tend to produce more utterances than boys according to the theories above.

There is a popular believe that girls are more advanced in language development than boys. There have been a number of reviews of the literature on sex differences in language developmental like:

Jespersen (1922) (in: Macaulay, 1978, 353-363) observe that little girl on the average learn to talk earlier and more quickly that boys; they outstrip them in talking correctly; their pronunciation is not spoilt by many bad habits and awkwardness so often found in boys.

McCarthy (1954) (in: ibid) "one of the most consistent finding to emerge from the mass of the data accumulated on language development in favor of girls in nearly all aspects of language than have been studied.

Garai and Scheinfeld in a smaller number of studies came to the same conclusion: "studies of verbal ability have shown that girls and woman surpass boys and men in verbal fluency, correct language usage, sentence complexity, grammatical structure, spelling and articulation, while males tend to excel in verbal reasoning and comprehension (Garai and Scheinfeld, 1968, 198-200).

Boys and girls are definitely different, even in their language acquisition. By this research, boys and girls are researched naturally in their school in kindergarten based on the theories and then applied them. By finding the types of English sentences by four and five years old children, it would be easier to investigate the tendency between males or boys and females or girls in acquiring English language.

RESEARCH METHODOLOGY

This research will be conducted by applying descriptive qualitative research design. Bogdan & Biklen (1992: 1) says qualitative means to find out how a theory works in different phenomena. This research is a case study. An observation will be made as the research method of this study. This study will find out how theory of analyzing in a phenomenon of language use in order to observe the acquisition of English language sentences by kindergarten students based on gender perspective.

By using purposive or convenience sampling, then this study will be conducted the subjects from TK Kristen Kalam Kudus Pematangsiantar, located in Jln. Mariam Tomong No.11, Siantar Barat, Pematangsiantar. The main goal of purposive sampling is to focus on particular characteristics of a population that are of interest, which will best enable researcher to answer the research questions. Subjects are selected based on their having similar characteristics because such characteristics are of particular interested to the researcher.

The samples are 20 children in K-2 David class (Kindergarten B) at the age of four to five years old. TK Kristen Kalam Kudus Pematangsiantar is still the one and only kindergarten which use English as basic language in teaching and learning in Pematangsiantar. There are 11 boys and 9 girls in this class.

Marshall & Rossman (1995) stated that the fundamental methods relied on qualitative research by researcher for gathering information are, participation in the setting, direct observation and interview. The writer role is as a key instrument. The beginning step of collecting data is observation of the students. Recording technique will be used to obtain the

data. This research will be conducted twice a week for a month. The students will be observed and the number of English sentences that they acquired naturally will be recorded. The observation will be focused in the school classroom (language room, mathematic room), corridor and outdoor play ground. The students will be observed in natural setting to get the data of this study. After observation is documenting the utterances. After making an observation and documenting, the next step is simplifying the utterances which are said by boys and girls. Then simplify again according to the types of sentences which are said by boys and girls. This is to say that the data is transcript and analyzed to identify the English language sentences acquisition uttered by kindergarten students.

There were some problems faced by the researcher in using video recording during collecting the data from the students. For instance, there were some sentences getting missed due to the sudden speech or the ones which were overheard. To reinforce the record ones through video recorder and gain what was missed or to cover all sentences, the researcher used note-taking at the same time. The fact that by this way, video recording and equipped by note-taking in getting the data, the researcher could get more complete data about children's language acquisition development and minimize missing things.

The technique of the data analysis will be applied based on interactive models techniques by Miles, Huberman and Saldana theory (2014: 161), which consist of some steps:
1. Data condensation is a process of selecting data, focusing, simplifying, abstracting, and transforming the data. Here researcher will select the sentences that uttered by the students, then focus on the English sentences and simplifying the data.
2. Data display through textual representation of sentence acquisition by kindergarten students.
3. Conclusion will be drawn or verified based on the data display. In this step, based on the data display explaining the types of sentences uttered in the students' interaction.
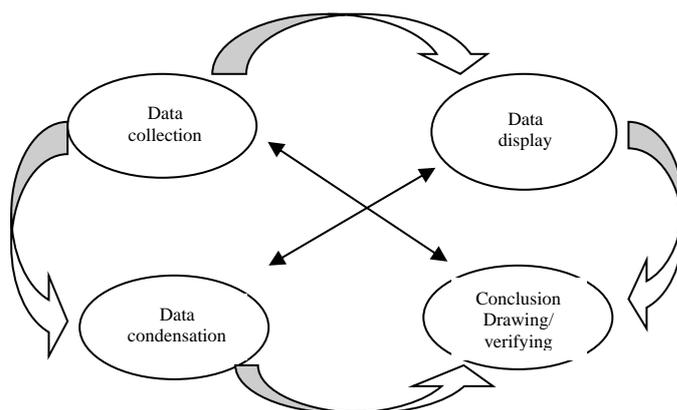

Figure 1. Interactive model of analysis by Miles, Huberman & Saldana (2014)

RESULT AND DISCUSSION

The Types of English Sentences Acquired by Four and Five Years Old Children

The types of sentences were classified based on Greenbaum and Nelson (2002: 16-17). The four types are Declarative, Interrogative, Imperative, and Exclamatory sentences. The declarative sentence is a sentence in which something is stated or told. The pattern has the following syntactic characteristic: Subject whole verb. The sentences which are informative have the declarative sentence pattern. Interrogative sentence is a sentence which something is asked or ordered. It can be declarative question, *Yes-no* question, *Wh*-question, alternative question, or tag question. The imperative sentence is used when someone wants other people to do something for him or her. Imperative sentences usually do not have a subject. Exclamatory sentences express strong feeling. They indicate the extent to which the speaker is impressed by something.

The proportion of the types of sentences acquired by boys and girls of four and five years old can be seen in the Table 1.

Table 1. Percentage number of sentences acquisition by boys and girls of four and five years old children

No	Types of Sentences	Frequency of Data		Percentage (%)	
		Males/Boys	Females/Girls	Males	Females
1.	Declarative Sentences	9	17	34.61	65.38
2.	Interrogative Sentences	11	14	44.00	56.00
3.	Imperative Sentences	7	9	43.75	56.25
4.	Exclamatory Sentences	2	3	40.00	60.00
	Total	29	44	100	100

From the Table above, it can be concluded that types of sentences acquired by boys and girls were declarative, interrogative, imperative, and exclamatory. It also can be seen that the highest percentage from the types of sentences used by males or boys namely: interrogative sentences about 44.00 %, while for females or girls were declarative sentences about 65.38%. The second for males were declarative sentences about 34.61 %, while for females were interrogative sentences about 56.00%. The third for males were imperative sentences about 43.75 %, and for females were imperative sentences about 56.23%. While exclamatory sentences were the lowest percentage found in sentences acquisition by males or boys of four and five years old about 40.00 %, and for females or girls were exclamatory sentences about 60.00%. This is according to the frequency of the data.

The Tendency between Boys and Girls in Acquiring English Sentences

Commonly, male and female of four and five years had acquired all types of sentences. Although there are some difficulties occurred due to grammatically pattern, or they still hard to differentiate between past and present time. But overall, the sentences are understandable in the context. Furthermore, male tend to use simple sentences or simple statement in their daily conversation. But in this case, we can see that females acquired more complex verbal sentences than males did.

To make it clear about the proportion of types of sentence acquisition by boys and girls of four and five years old, it can be seen below.
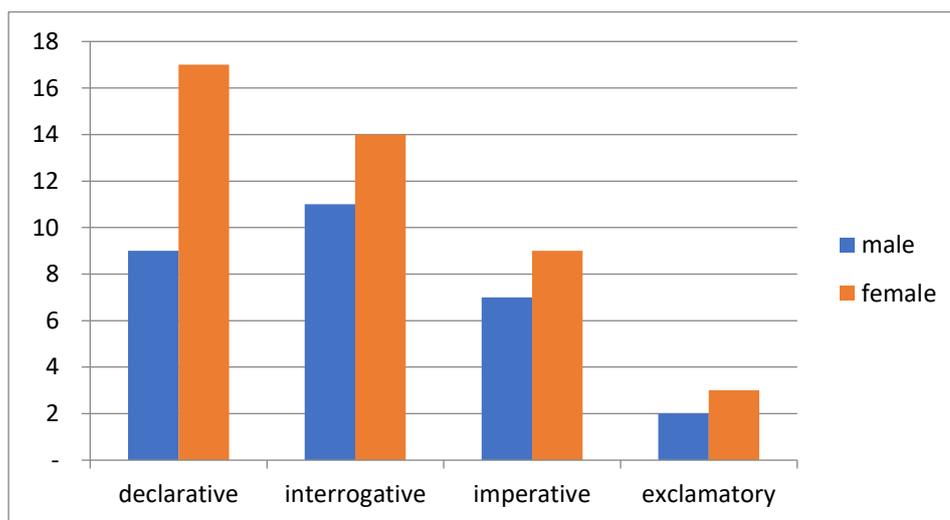

Figure 2. Graphic of types of sentence acquisition by four and five years old children

From the graphic in figure 2 above, it can be seen some differences about the types of sentences acquired by males or boys and females or girls of four and five years old. It is cleared that females are higher than males in language acquisition and verbal fluency. Females or girls acquired more sentences in declarative, interrogative, imperative, and also exclamatory. This proved that females or girls have the ability to speak and learn English more prominent than males or boys. Studies of verbal ability have shown that girls and women surpass boys and men in verbal fluency, correct language usage, sentence complexity, grammatical structure, spelling, and articulation (Karmiloff, 2002).

Discussion

Language acquisition is the process by which human acquire the capacity to perceive, produce, and use words to understand and to communicate. Every child has been equipped with a capability to understand the language that is spoken by people around him. So, whatever language exposed to the children, the children must be able to understand and to communicate that language which is exposed to them.

Input is a determinant factor of how well the children acquire the language. While input refers to the amount of language exposed to them (Krashen, 1987). When there is no input there will be no acquisition. The sources of input are the people around the children, the more people around them, the more input the children will have. The more talkative the people around the children, the more input will be exposed to them. That's why it is found in this research that

each of the students has different capabilities in acquiring English sentences; depend on the input they got from home, school, or their environment.

Language is not taught explicitly; instead, it is learned through communication. Thus, the more opportunities children have to interact with other language users, the more linguistic input they have to analyzed and learn from. Not surprisingly, research suggests that children exposes to larger amounts of adult input develop larger, richer vocabularies and more advanced syntactic skills than children exposed to more limited input (Huttenlocher, 1998). Parents and caregivers who encourage conversation, ask questions, and build on conversations that their children start, have children with more advanced language abilities (Hoff & Naigles, 2002). Results from the National Institute of Child Health and Human Development (NICHD), Early Child Care Research Network (2000) likewise demonstrate that regardless of whether child care takes place at home, with family members, or in a formal child care setting, input is nevertheless crucial to language development.

When teachers and caregivers talk to children, ask questions, and wait for answers, they create a more stimulating language environment. This environment results in children who know more letters, colors, and shapes at age 3 than children who are not addressed as frequently. Early language stimulation remains one of the best predictors of later vocabulary, reading, and mathematical skills.

CONCLUSION AND SUGGESTION

Conclusion

Based on the data and the findings presented before, the researcher has formulated the conclusions as the following:

1. Males or boys and females or girls of four and five years old in Kindergarten-2 of TK Kristen Kalam Kudus Pematangsiantar have acquired declarative, interrogative, imperative and exclamatory sentences form. They are able to produce declarative questions, *yes-no* questions, and *wh*-questions.

2. The highest level from the types of sentences used by males or boys namely: interrogative sentences, while for females or girls were declarative sentences.

3. The tendency can be seen that females are higher than males in language acquisition and verbal fluency. Females or girls acquired more sentences in declarative, interrogative, imperative, and also exclamatory. This proved that females or girls have the ability to speak and learn English more prominent than males or boys.

Suggestion

After concluding the research, the suggestions are stated as follows:

1. To improve the English language acquisition since the early age, the kindergarten's teachers and parents are suggested to consider about its supporting factors.

2. For those who are interested in children language acquisition at early age, suggested to use this study as one of the references.

3. Other researchers can develop further study about English acquisition conducted to other subjects in other area.

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