



Faculty of Cognitive Sciences and Human Development

CHILDREN'S KNOWLEDGE AND EXPLANATION ABOUT PLANTS

Nur Aliaa Binti Abdul Aziz

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2011

Bachelor of Science with Honours
(Cognitive Science)
2011



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CHILDREN'S KNOWLEDGE AND EXPLANATION ABOUT PLANTS

NUR ALIAA BINTI ABDUL AZIZ

**This project is submitted in partial fulfilment of the requirements for a
Bachelor of Science with Honours
(Cognitive Sciences)**

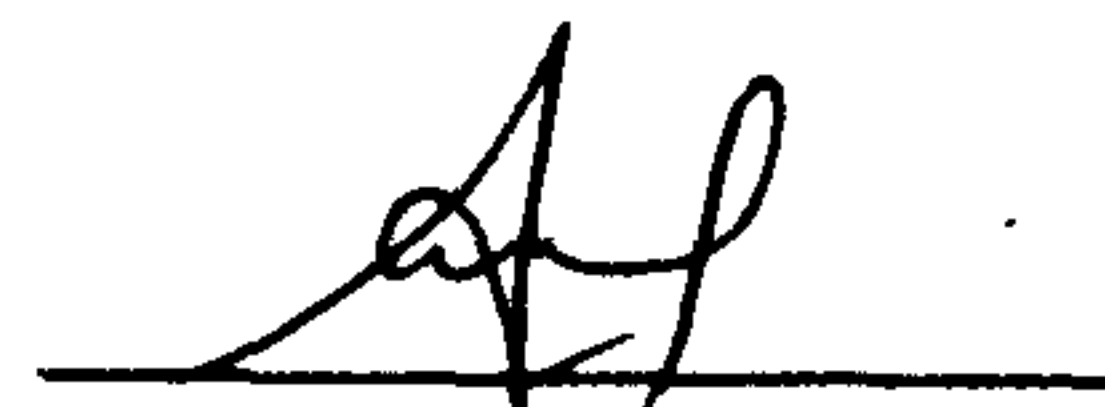
**Faculty of Cognitive Sciences and Human Development
UNIVERSITI MALAYSIA SARAWAK
(2011)**

Statement of Originality

The work described in this Final Year Project, entitled
“Children’s Knowledge and Explanation about Plants”
is to the best of the author’s knowledge that of the author except
where due reference is made.

11/5/2011

(Date submitted)



(Student’s signature)

Nur Aliaa binti Abdul Aziz

21891

This project entitle “**Children’s Knowledge and Explanation about Plants**” was prepared by *Nur Aliaa binti Abdul Aziz* and submitted to the Faculty of Cognitive Sciences and Human Development in partial fulfillment of the requirements for Bachelor of Science with Honours in *Cognitive Sciences*.

Received for examination by:



(Mr. Philip Nuli Anding)

Supervisor

Faculty of Cognitive Sciences and Human Development

Universiti Malaysia Sarawak

Date:

Gred

ACKNOWLEDGEMENT

Bismillahirrahmanirrahim...

With pleasure, I would like to express my gratitude to Allah S.W.T for blessing and giving me faith in completing this final year project. As with all great facts, the completion of this study also could not have been possible without the combined efforts of many wonderful people.

First of all, I would like to give my sincere thanks to my honorific supervisor, Mr. Philip Nuli Anding who nurtured the development of this study from its infancy and supervised me with a great patient. Besides that, I would like to thanks to my co-evaluators, Dr. Zaimuariffudin who gave a lot of useful suggestions.

Furthermore, I would like to express my appreciation to the headmistress and teachers at the primary school who willing to spend their precious time to arrange the time for me to conduct the study. Moreover, without the participation of the respondents from primary school, the research could not be completed in time. So, thanks a lot for their willingness to take part in the study.

I would like to appreciate Universiti Malaysia Sarawak (UNIMAS) to offer me the Cognitive Sciences Program and give me an opportunity to do the research which relevant to that program. In addition, I would like to express my thankfulness to all my friends who offered me so much kindly help. I greatly appreciate their time and heartiest thanks to all the others.

Last but not least, gratitude to my family members, especially to my mum and dad who encourage me both in writing of this research and throughout my daily life.

I hope this study could be beneficial for the future researchers as well as the readers.

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ABSTRACT

CHILDREN'S KNOWLEDGE AND EXPLANATION ABOUT PLANTS

Nur Aliaa binti Abdul Aziz

The purpose of this study is to understand the children's knowledge and explanation about plants. This study was conducted in one school in Muara Tuang district. The objective of the study is to identify the children's knowledge and explanation about plants and also to construct the model that represents the children's knowledge and explanation about plants. 16 respondents from primary 1, 2, 3, 4 and 5 were selected for this study. A qualitative study with discourse and interview as the instruments were used in this study. The used of the discourse or conversation technique is to make the respondents feel more comfortable to give the answers. In addition, interview method was used in order to obtain more in depth understanding on the answers given by the respondents. The data was collected and transcribed manually, and then analysed by interpreting the meaning of the data. Children's knowledge of plants was observed to increase with age. Parents were identified as the main source of children's knowledge. The findings present the limited knowledge and explanation that children hold about plants. This study also underlines the importance of early learning in science in shaping children's conceptions, definitions, understanding and explanation of concepts relating to plant. Discussion, recommendation and future researcher were also provided in this study.

ABSTRAK

PENGETAHUAN KANAK-KANAK DAN PENERANGAN MEREKA TENTANG TUMBUH-TUMBUHAN

Nur Aliaa binti Abdul Aziz

Kajian ini bertujuan untuk memahami pengetahuan dan penerangan kanak-kanak tentang tumbuh-tumbuhan. Kajian ini dijalankan di sebuah sekolah di daerah Muara Tuang. Tujuan kajian ini adalah untuk mengenalpasti pengetahuan dan penerangan mereka tentang tumbuh-tumbuhan dan juga untuk membina model yang mewakili pengetahuan kanak-kanak dan penerangan mereka tentang tumbuh-tumbuhan. 16 responden daripada darjah 1, 2, 3, 4 dan 5 telah dipilih untuk kajian ini. Sebuah penelitian kualitatif dengan perbualan dan temubual sebagai instrumen yang digunakan dalam kajian ini. Teknik perbualan digunakan supaya responden berasa lebih selesa untuk memberikan jawapan. Selain itu, kaedah temubual digunakan untuk mendapatkan pemahaman yang lebih mendalam tentang jawapan yang diberikan oleh responden. Data dikumpulkan serta ditranskripsi secara manual dan kemudian dianalisa dengan menterjemahkan maksud data. Pengetahuan kanak-kanak tentang tumbuh-tumbuhan diperhatikan meningkat megikut usia. Ibu bapa dikenalpasti sebagai sumber utama pengetahuan anak-anak. Penemuan kajian menunjukkan pengetahuan dan penerangan kanak-kanak tentang tumbuh-tumbuhan adalah terbatas. Kajian ini juga menggariskan kepentingan pembelajaran awal sains dalam membentuk konsepsi kanak-kanak, definisi, pemahaman dan penjelasan tentang konsep-konsep yang berkaitan dengan tumbuh-tumbuhan. Perbincangan, cadangan dan penyelidikan masa depan juga ditunjukkan dalam kajian ini.

CHAPTER 1

INTRODUCTION

1.0 Introduction

This chapter begins with a general description of the background of the study. This is followed by the problem statement and research objectives which further elaborate on the need to explore the understanding in the children's knowledge and explanation about the plants. Then it moves on the significance of the study which focused on the practical application of the study. The limitation of study is also included in this chapter.

1.1 Background of the study

Knowledge plays an important role in human life. Without knowledge, human life is meaningless and terrible. Therefore, humans need knowledge to make their live better-rounded and more organised. As human beings, the potential to acquire knowledge and learn new things are happens in everyday throughout the lives (Payer, 2010). This is because knowledge comes to people by their experiences in life.

According to the Federal Chambers Advanced English Dictionary (2000), knowledge is information, skills, theoretical or practical understanding about something which are gained through experience or education. Moreover, life can be an instrument that leads human to acquire knowledge in everyday of their life.

Knowledge can be classified into two aspects which are linguistic and technical terms (Shaykh Muhammad Ibn Saalih Al-Uthaymeen, 2004). In linguistic terms, knowledge is something that eliminates ignorance, being a sure and firm comprehension of something. Whereas, technically some people of knowledge said that knowledge is awareness, contrary to ignorance. Whilst others have stated that knowledge in and of itself is clear. But, for the Islamic religion, knowledge is a light by which humans are guided and taken out of darkness into light.

According to Locke (2007), knowledge is the perception of the agreement or disagreement of two ideas. He gives us the first clue of what knowledge is all about. He said when human sense organs were stimulated, it produces “idea of sensation”. Then, our minds operated the idea of sensation to produce “ideas of reflection”. Thus, ideas come to us through our senses which can be turned into new idea via reflection. The ideas taken from these two routes are derived from experiences (Locke, 2007). Therefore, we can have no knowledge away from our ideas.

Locke further divides knowledge into three types which are intuitive knowledge, demonstrative knowledge and sensitive knowledge. Intuitive knowledge involves direct and immediate recognition of the agreement or disagreement of two ideas. For instance, human naturally know that a dog is not the same as an elephant. However, demonstrative knowledge is when we perceive the agreement or disagreement indirectly through a series of intermediate ideas. For example, “I know that A is greater than B and B is greater than C, thus I know demonstratively that A is greater than C”. Whereas, sensitive knowledge is when our sensory ideas are caused by

existing things even when we do not know what causes the idea within us. For example, "I know that there is something producing the scent which I can smell".

1.2 Knowledge and thinking

Humans need knowledge in order to think well. This is because, without knowledge humans cannot think abstractly and only can make general explanation or conclusion about something. Therefore, with the knowledge humans can build their thinking skills. Thinking skills are the mental processes that we apply when we seek to make sense of experience. Thinking skills enable us to integrate each new experience and knowledge into the schema that we are constructing of "how things are". It is apparent that better thinking will help us to learn more from our experience and to make better use of our intelligence.

During childhood, the ability to acquire knowledge and form thinking happens in everyday of our life. A recent review of categories in young children's thinking (Gelman, 1998) is one of the domain knowledge aspects which consider implications for early childhood education. The way children perceive the world around them is different from adults. Gelman (1998) states that even young children are able to make sense of their world by using categories or groupings of things but that differs in some ways. Subsequently, the categories become foundation for later learning in school.

Normally, young children are having difficulty when they need to think scientifically or to differentiate something. This is because they are not really exposed to the scientific knowledge which comes from education. However, children have their own thought, idea and initial belief about the world around them based on hearing how other people name objects and phenomena which come from visible and auditory sources. These visible and auditory sources develop their everyday concepts and

explanation about the world. When entering school, children begin to learn scientific knowledge that is non-experiential and develop the scientific level of thinking.

1.3 Children's Knowledge

In a major review of research on knowledge acquisition in foundational domains, Wellman and Gelman (1998) examine the renewed interest in knowledge, how it is organized, and how it changes over time in every stage of human life. Children obtain their knowledge from sense, observation and through the guidance of their parents. However, the knowledge is not something that is given to children as though they need to learn from what they see and observe.

Children acquire knowledge about the physical and social worlds in which they live through playful interaction with objects and people. This statement support the Piaget's cognitive-developmental theory which promoted the view that children learn most effectively through interaction with the physical environment (Life-span development, 2008). They do not need to be forced to learn but they are motivated by their own desire to make sense of their world and with the help of parents to build ways of learning at early age. Usually, parents will be their children's first teacher for guiding them because they did not have the ability to live by their own self.

Wellman and Gelman (1998) define foundational knowledge as "those concepts or bodies of knowledge that en-ender, shape, and constrain other conceptual understandings". They propose that in contrast to earlier research on children's knowledge, such as Piaget's major studies of children's concepts which emphasized *domain-general structures and processes*, recent research has focused on the knowledge itself, as the *content* on which the mind works. Much of this work has involved the study of what sorts of knowledge children have, and the mechanisms that account for this knowledge. Numerous studies have indicated that young children possess early *domain-specific knowledge* that conforms to the criteria of "a core of

systematic beliefs and distinctions" that characterize a knowledge domain (Wellman & Gelman, 1998).

1.4 Children's Explanation

Explanation takes children's understanding of the world beyond simple observation of events, to the causal relations connecting them, and through to logical conclusion (Cristidou & Hatzinikita, 2005). In this perspective, providing children with opportunities to develop their explanatory capacity, helping them to understand teachers' explanations and to be able to discuss and evaluate their own explanatory which can be fundamental in learning science. On the other hand, if children are not capable of handling explanations, then the possibility of their taking advantage of their first years of education is seriously restricted (Donaldson & Elliot, 1990; Newton & Newton, 2000; Pramling & Pramling-Samuelson, 2001; Blake & Brown, 2002).

Children's explanations and use of causality has been a classic topic since Piaget's (1929) work, which has regained researchers' interest in light of early domains of knowledge that children are believed to construct in order to make sense of their everyday life experience. An analysis of children's explanations of natural phenomena can reveal their capacity for reasoning about non-obvious mechanisms, such as the origin of natural kinds such as clouds or the causal explanations of the structure and behaviour of plants (Gelman & Kremer, 1991).

1.5 Problem Statement

Today, with children's lives disconnected from the natural world, their experiences are predominately rooted in media, written language and visual images (Chawla, 1994). The virtual is replacing the real (Pyle, 2002). TV, nature documentaries, National Geographic and other nature TV channels and environmental fundraising appeals are conditioning children to think that nature is exotic, awe-inspiring and in far, far away, places they will never experience (Chipeniuk, 1995). Children are losing the understanding that nature exists in their own backyards and neighborhoods, which further disconnects them from knowledge and appreciation of the natural world.

Even though they can see plants around their house and school area, they still lack understanding in the way plants are formed and grown. The process of forming idea about the natural world in children exist when the information is received by their sensory organ whether directly or indirectly ways (Payer, 2010). But their knowledge is changing when they start to get information from their parents and scientific education in school. Hence from this research, the researcher will get more understanding on how children develop their knowledge, explanation and understanding about what and why something is happening around them.

A considerable amount of research has focused on different dimensions of school children's understanding of plants. However, the previous research reported mainly refers to pre-school students (Christidou & Hatzinikita, 2005). Research on primary school children's thought is generally limited, and this applied that constitute the focus on this study. There is also a lot of research about the matter in oversea but most of them prefer to do only in interview form which is different from this study that use two methods which are in conversation and interview form. This paper sets out to explore the characteristic of children's explanations, knowledge, thought and idea about natural phenomena which are plants.

1.6 Objective of the Study

1.6.1 General Objectives

The general objective of this research is to understand the children's knowledge and explanation about plants.

1.6.2 Specific Objectives

The specific objectives are as follows:

1. To identify the children's knowledge about plants.
2. To identify the children's explanation about plants.
3. To construct the model that represents the children's knowledge and explanation about plants.

1.6.3 Research Questions

1. What is the children's knowledge of plants?
2. What is the children's explanation about plants?
3. What are the models that represent the children's knowledge and explanation about plants?

1.7 Significance of Study

This study contributes to the understanding on the ways children acquire knowledge and explanation about plants. From this study, the researcher can get a better understanding on how the children's knowledge before entering the school influences the new knowledge which is scientific knowledge that is acquired from formal teaching in school. Moreover, this study will help the researcher to identify the type of explanations middle children use when reasoning about plants growth and formation.

This study can also be a reference or guidance to the reader for helping the children to think scientifically and improve their understanding about natural world. This study is also important in improving the teaching and learning activities in early year of education for enhancing the characteristics of children's explanation about the nature world.

1.8 Limitation of Study

One of the limitations of the study is focuses only on middle school children. Children who are aged between 7 to 11 years old have been chosen as the respondents of this study. This study also focuses on using two methods only for collecting data. The methods used are discourse and interview for conducting the research. Moreover, this study also focuses on children understanding only to the plants growth and formation.

In addition, this study was conducted at one school only which is located in particular area at Muara Tuang district. The number of respondents used for the interview was limited to 16 students only due to time constraints.

1.9 Summary

This chapter discussed the introduction, problem statement, objectives, research question, the significance and the limitation of the study. The next chapter will review the previous researches related to this study.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

This chapter discusses the previous studies involving children and their knowledge, understanding and explanation of natural phenomena. This literature review is important as a guideline to complete this research and all the related previous research will give better understanding towards this study.

2.1 Cognitive Development in Children

Cognitive means thinking. Cognitive is a mental process involving perception, attention, memory, language, problem solving, reasoning and decision making (Goldstein, 2005). Thus, this perspective asserts the importance of human abilities to think, to process and evaluate data and information before reacting to it (Mohmood Nazar Mohamed, 1992). While cognitive development is a field of study in

neuroscience and psychology focusing on a child's development in terms of information processing, conceptual resources, perceptual skill, language learning and other aspects of brain development and cognitive psychology (Wellman & Gelman, 1992).

Furthermore, cognitive development refers to the changes that occur in an individual's cognitive structures, abilities, and processes. Marcy Driscoll defines cognitive development as the transformation of the child's undifferentiated, unspecialized cognitive abilities into the adult's conceptual competence and problem-solving skill (Driscoll, 1994). In this cognitive development topic, there are two theories that play an important role which are Piaget's and Vygotsky's theory.

2.1.1 Piaget's Theory of Cognitive Development in Children

Jean Piaget developed the theory of cognitive development about the nature and development of human intelligence. It is primarily known as a development stage theory, but in fact, it deals with the nature of knowledge itself and how humans come gradually to acquire it, construct it, and use it. Moreover, Piaget idea claims that cognitive development is at the centre of human organism and language is contingent on cognitive development. Also, Piaget believed that children's schemes, or logical mental structures, change with age and are initially action-based which is sensory motor and later move to a mental which is operational level (Driscoll, 1994). Below are the descriptions about the cognitive development of stages in children.

Based on Piaget's theory of development (Paget & Barbel, 1969), there are four stages in cognitive development of children's which are sensory motor stage from birth until age 2 years, preoperative stage from ages 2 to 7 years, the concrete operational stage from age 7 to 11 years and lastly is formal operational stage from age 11 and above. During the first stage of sensory motor, infants and toddlers sense with their eyes, ears, hands, and other sensory motor equipment. Piaget said that a child's cognitive system is limited to motor reflexes at birth, but the child builds on

these reflexes to develop more sophisticated procedures. They learn to generalize their activities to a wider range of situations and coordinate them into increasingly lengthy chains of behavior.

Through this stage also, children begin to change from organism to organism that is thought to reflect the language, to distinguish the objects from themselves and capable to make a classification. They also capable to do something and coordinate information received. While in the second stage of the preoperative level, according to Piaget, children acquire representational skills in the area of mental imagery, and especially language. The language learning occurs rapidly in children in which they are able to name the things, start to represent the word, images, drawings and symbolic thought which goes beyond simple connections of sensory information and physical action. They are very self-oriented and have an egocentric view. Egocentrism is inability to distinguish between one's own perspective and someone else's (Life-span development, 2008).

As opposed to preoperative level, the third stage of concrete operations occurs when the children able to take into account another person's point of view and consider more than one perspective simultaneously, with their thought process being more logical, flexible, and organized than in early childhood. They can also represent transformations as well as static situations. Although they can understand concrete problems, Piaget would argue that they cannot yet contemplate or solve abstract problems, and that they are not yet able to consider all of the logically possible outcomes. They are able to understand simple concepts and hypotheses. Children at this stage would have the ability to pass conservation, classification, seriation and spatial reasoning tasks.

Finally for the final stage of the formal level between age 11 years and above, children begin to think abstractly and logically which they are able to solve concrete problems. They can also reason theoretically. Piaget considered this the ultimate