RELATIONSHIP BETWEEN COGNITIVE STYLE AND READING ABILITY AMONG PRIMARY SCHOOL STUDENTS.

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ABSTRACT: *The main aims of the study was to identify the students' cognitive style. Secondly, to find the relationship between students' cognitive style and their reading ability in Malay Language. Sample of the study consisted of 130 students (65boys, 65 girls) from selected primary schools in Malaysia. The participants were selected from standard 4 and 5 (10-11years old). Methodology of study was survey using questionnaire to collect data. In data collection, three instruments were used namely revised 'Group Embedded Figures Tests' (GEFT), demographic questionnaire and reading test. From data collected, researcher were able to identify student's cognitive style either 'Field Independent' (FI) or 'Field Dependent'(FD). Data were analyzed using descriptive and inferential statistics. Finding of the study showed that there were more participants with Field Independent cognitive style (97 students) than Field dependent (33 students). The study also found that there were positive correlation between cognitive style and reading ability. Teacher should be cautioned that student differ in their way of perceiving and obtaining information. Implication of the study was, teacher have to understand the students' way of perceiving information and prepare their teaching approach and activity suitable with their student preferences. Teachers should be creative in diversifying education techniques in class by being sensitive with students' learning needs.*

Keywords: Cognitive style, primary school students, Field Independent (FI), Field Dependent (FD).

1. INTRODUCTION

In the 21st century, academic achievement has become one of the important indicator for teachers in identifying the students understanding level as recommended by the Malaysia Education Ministry (MOE). As this idea was supported by Azizi Yahaya and Nurfaizah Abd Majid [1], which emphasizes the optimal use of the students' natural capabilities in generating a significant achievemen. One of the natural capabilities is individual cognitive style. According to Tan Oon Seng *et al*.[2], "Cognitive style is students' most comfortable, consistent, and expedient ways of perceiving and making sense of information in the environment". Whereby learning style is, "biological and socialized differences for how students learn". Anyway these two concepts have been used interchangeably. Witkin et. al. 1971 in Meor Ibrahim Kamaruddin *et al*.,[3], define cognitive style as, "The characteristic self consistent modes of functioning which individual show in their perceptual and intellectual activities". Witkin and Goodenough [4], founded two types of cognitive styles namely 'field independent' (FI) and 'field dependent'(FD). Witkin *et al*. [4] found that student with different cognitive style have differences in their subject's preferences and achieved better in those subjects. FI students showed better achievement in subjects like Mathematics and Science and FD students achieved better in subjects like Literature, Language and History. As a conclusion, Woolfolk [5] summarized that cognitive style are the individual perceptual way of perceiving and obtaining information from their environment whereby learning style are the individual preference in how to study. Meor Ibrahim Kamaruddin *et al.* [3] have done research on the 'Relationship between cognitive styles, levels of cognitive thinking and chemistry achievement among form four students. Sample of the study comprised of 163 form four Science students from few secondary schools. He categorized the students cognitive style into three categories namely field independent, field dependent and Intermediate. Finding of the study showed that many of the students were from dependent cognitive style (100 students from 163 students) and cognitive style have no relationship with chemistry achievement. On the contrary, Poh Bee Theen and Melissa Ng [6] study the cognitive style among form six students and their General Paper achievement. Sample of study consisted of 152 students (60 boys, 92 girls). They used GEFT to categorized the students into two category of cognitive style either field independent or field dependent. Their finding showed that many of the students were field independent (83 FI, 69 FD) cognitive style and there is a positive correlation ($r=0.15$, $p<0.5$) between cognitive style and general paper achievement. The study also found the effect of gender, ethnicity and cognitive style on the students' achievement. Study by Ramlah Jantan [7] attempt to identify students' cognitive style among 150 students (71 boys, 79 girls) in few primary schools in Selangor. The objective of this study was to find the relationship between students' cognitive style and their mathematic achievement. The study used GEFT to identify the students' cognitive style. Finding of the study showed that 112 of the students were from FD cognitive style and 38 students were from FI. The study also found positive correlation between students' cognitive style and their mathematic achievement. The study also found the tendency among girls to have FD cognitive style. Another study by Ramlah Jantan and Md. Nasir Masran [8] try to find the relationship between teachers' teaching style and students' cognitive style with students' Mathematic achievement among primary school students. Participants of study consisted of 395 students (standard 3-6) with their 13 Mathematic teachers from selected schools in Perak and

Selangor (Malaysia). GEFT was used to identify students' cognitive style to be either Field-Dependent (FD) or Field-Independent (FI). The study found more students were from Field Dependent (248 students) cognitive style compared to Field Independent (147 students). Result of regression analysis showed that there were significant effect of teachers' teaching style and students' cognitive style on their mathematic achievement. Finding also showed that coefficient correlation on the effect of teachers' teaching had greater influence than students' cognitive styles on their mathematic achievement. Another study by Teo Huey Shia and Ramlah Jantan [9] authors attempted to identify students' cognitive style among form four science students and their Mathematic achievement. The students' cognitive style was categorized into 3 categories namely Field Dependent, Field Independent and Intermediate. Sample of study comprised of 40 form four students. Finding showed that 13 students were Intermediate, 5 students were Field Dependent and 4 students were Field Independent. The study also found that the cognitive style has effect on the students' academic achievement. However, there were very few studies have been done on the primary school students' cognitive style. Therefore, the main objective of this study was to identify the students' cognitive style among primary school students in order to fill the missing gap. GEFT was used to identify their cognitive style to be either field dependent (FD) or field independent (FI). Secondly, this study aims to find the relationship between the students' cognitive style and their reading ability.

1. Cognitive Style and Reading Ability

The Malaysia Ministry of Education (MOE) has introduce "LINUS" (Literacy and Numeracy program) to the school in 2011 that aimed to combat illiteracy among primary school students. According to Yahya [10], through reading a child acquired facts and knowledge. When a child's read, he tries to understand its content and making the meaning rational to him. Yahya [5] also quote, while reading, two process was involved, to understand and to interpret the idea from the written text. Those process happened simultaneously when a person read and understand the written text. Berk [11] also agree with Yahya's opinion. Berk [11] stated that reading makes use of many skills at once, taxing all aspects of our information-processing system. We must perceive single letters and letter combinations, translate them into speech sounds, recognize the visual appearance of many common words, hold chunks of text in working memory while interpreting their meaning, and combine the meanings from various parts of a text passage into understandable whole. So, we can conclude reading involve complex processes such as identifying letters, combining letters, learn the sound of letters and words, making meaning of the sentences. Few studies have been done by students such as in students' dissertation. Therefore, this article will state some of them. Study by Shunurul Haiza [12], used GEFT to identify students' cognitive style. Sample of the study involved 40 students (20 boys, 20 girls) from primary schools. Finding of the study showed that 57.5% of the participants were from Field Independent (FI) and 42.5% were from Field Dependent (FD) cognitive style. This showed that more students in the study were from Field Independent (FI) cognitive style. This study also found positive correlation between cognitive style and Malay Language achievement (reading and writing). Another study by Razman Mohd. Salleh [13] also used GEFT test to identify students' cognitive style either Field independent (FI) or Field dependent cognitive style and try to find the relationship between students' cognitive style and their Malay Language (reading and writing) achievement. Sample of study consist of 100 (60 boys, 40 girls) primary school students. Razman [13] found that 57% were from FI cognitive style compared to 43% students were from FD cognitive style. The study also found significant and positive correlation between students' cognitive style with Malay Language achievement. Suryani Talib [14] used revised GEFT to identify students' cognitive style among 90 primary school students. Her finding showed that 82.2% of the students were from FI and 17.8% were from FD cognitive style. The finding showed that more students in the group were from FI cognitive style. The study also found positive correlation between students' cognitive style and their reading test score.

3. Field Dependent (FD) and Field Independent (FI) Cognitive Style

The term FI and FD were first coined by Witkin and Goodenough, 1971 in Meor Ibrahim Kamaruddin et al., [3]. The term attempts to explain individual differences in perceiving and obtaining information [15]. In order to differentiate people according to their cognitive style Witkin et al., devised few test such as body and frame test, rod and frame test and finally Group Embedded Figure Test (GEFT).

The FD and FI cognitive style were also associated with learning activities such as subject preferences, group activity and teaching approach suitable with the students [3].

Table 1 The students' cognitive style preferences

Cognitive style	
Field dependent (FD)	**Field independent (FI)**
Perceive information globally	Perceive information analytically
Generalize concept	Specific concept
Social oriented	Individualistic
Dependent on others	Independent
Source of motivation from outside	Source of motivation from inside
Like informal relationship with teacher.	Like formal relationship with teacher.
Like discussion in group and cooperative learning.	Like to study alone and mastery learning

(Table adapted from Meor Ibrahim *et al*, 2004:17).

So the students' cognitive style may be affected personality traits and their way of thinking and behaving. Teachers should be creative in diversifying education techniques in class by being sensitive with students' learning needs. Stimulations will help students to be more attracted to learning session and instantly give attention.

The cognitive styles proposed by Witkin (1967) in [3:15] identify an individual as analytic or global. For example,when an individual is given a simple geometric

figure that is embedded in a complex figure, FI individual finds the task easy and able to do it faster than the FD individual. From the personality point of view, FD individual likes to socialize, whereas FI individual tends to do work independently.

Witkin and Goodenough, 1981 [in 15] stated that FI students can easily separate parts from the whole pattern, while FD students tend to see things as a whole pattern and find it difficult to separate a whole pattern into parts. Students with FD orientation tend to remember friends or people's face and social aspects such as birth date. FD students also like to work in group such as in cooperative learning compared to FI students who like to study independently and are better at manipulating number lessons, science facts and problem-solving.

According to Martin [16], theories about cognitive style were developed as a result of early studies conducted by Witkin, Lewis, Hertzman, Machover, Meissner, and Wapner (1954); Witkin, Dyk, Patterson,Goodenough, and Karp (1962); and Bruner (1966). These and other studies resulted in theories that generally assumed a single dimension of cognitive style, with an individual's style falling somewhere on a continuum between the extremes of this dimension. The background theory about cognitive style was laid by information processing theory. According to Berk [17], most information-processing theorists (Piaget, Gagne, Atkinson & Schriffin, 1968) view the mind as a complex symbol manipulating system through which information from the environment flows often using the metaphor of a computer. First, information is encoded - taken in by the system and retained in symbolic structure into a more effective representation, and then decoding it. The store model of the information-processing system assumes that we hold or store, information in three parts of the mental system for processing: the sensory register; working, or short-term, memory and long term memory by Atkinson & Schriffin, 1968 [in 17:161]. Information will go through sensory register, if the information is useful, it will be rehearsing and send to short term memory. This part holds limited amount of information that is worked on to facilitate memory and problem solving. To manage its complex activities, a special part of working memory, called the central executive, directs the flow of information. If the information is important, it will be rehearsing and send to long term memory. The longer we hold information in working memory, the more likely it will transfer to the long term memory. Long term memory stores information permanently and information can be retrieved if the person wants to use it. Long term memory are our permanent knowledge base, the largest storage area which is unlimited.

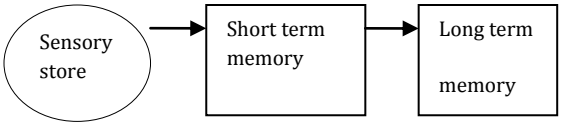

Diagram 1 Information Processing Model

According to Martin [16], based on theory of right and left brain and theories of cognitive styles, generalization about cognitive style can be made such as: There are distinct, observable, and measurable differences among people's cognitive styles. Cognitive style can easily be detected through language and nonverbal behavior patterns. Dialogue between individuals can reveal differences and can highlight the need for awareness and understanding of these differences. Styles are frequently associated with career choices; therefore, there are connections between behavioral styles and certain functions or divisions within an organization. In fact, style can dominate an organization's culture.

4. Objective of Study

The objective of the study, firstly was to identify students cognitive style either FI or FD. The students' cognitive style will be divided in two groups either Field Independent (FI) or Field Dependent (FD). Secondly, to find the relationship between students' cognitive style and their reading ability.

5. Hypothesis of study

In the study, only second objective has hypothesis because it will be analyzed using inferential statistic namely correlation. Result of correlation will explain to us whether students' Field Independent and Field Dependent cognitive style has relationship with their reading ability.

Ho2: there is no significant correlation between students' cognitive style and their reading ability.

6.The Methodology of Research

Methodology used was survey questionnaire. The questionnaire consisted of three parts: demographic questionnaire, revised Group Embedded Figures Test (GEFT) from Meor Ibrahim Kamaruddin et al. [3} and reading test. Participants of study consisted of 130 students from selected primary school in Perak (Malaysia). The GEFT comprised of 18 diagrams taken [3][9].

According to Meor Ibrahim Kamaruddin et al. [3], the set of GEFT questionnaire developed by Witkin et al [4] has been translated into Malay language and the questionnaire validity has been confirmed by four (4) University of Technology Malaysia professors. Where, this questionnaire has allocated time for each sub parts, namely the first sub 2 minutes, the second sub section 5 minutes, and the third sub 5 minutes to give the total 12 minutes for the participant to answer the GEFT test,

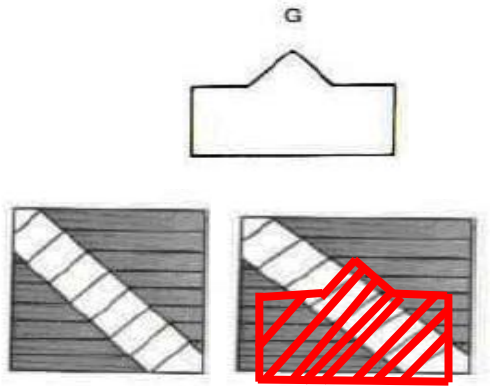

Figure *2*. GEFT test example. Adapted from "A cross-cultural comparison of cognitive styles in Arab and American adult learners using eye-tracking to measure subtle differences," *by* J. A. Qutub, 2008.

Moreover, the researchers have made improvements whereby small figure was attached to each diagram to help the students identify the geometry figure embedded in the

diagram. According to Yim [19], the validity of the 18 items in the GEFT questionnaire have been tested by using the Spearman-Brown prophecy formula. The validity value is 0.82 (Men = 80, female = 97). Analysis of the research pilot study found the validity of the GEFT test was 0.83. Figure 2 shows an example of GEFT questionnaire, in which participants have been asked to shade the figure G as displayed in G image by using pencil.

7. Data Analysis

Data were analyzed using software Statistical Package for Social Science (SPSS) version 23. Statistical analysis used were descriptive statistic such as mean, standard deviation, frequency, percentage and inferential statistic used was correlation. The hypothesis in the study was tested using Spearman correlation.

8.Finding of Study

Regarding students cognitive style (Table 2), finding showed that 97 (74.6%) students were from FI and 33 (25.3%) students were from FD cognitive style. This showed that more students were from FI than FD cognitive style. This study found that the reading ability of 90 students (70%) were good, 26 students (20%) were moderate and 13 students (10%) were low.

Table 2 Students' Cognitive Style

Gender	Cognitive style		
	Field Dependent n=33(25.3%)	**Field Independent N=97(74.6%)**	**Total 130**
Boys	15 (11.5%)	50(38.4%)	65
Girls	18(13.8%)	47(36.1%)	65

- Analysis of Spearman rho correlation was performed to test the hypothesis. The finding indicated that there was significant and positive correlation between cognitive style and reading ability with r value 0.67. If refer to correlation table, the value is moderate (Weirsma, 2000).

Table 3: Analysis of Correlation between Cognitive Style and Reading ability.

Variable	r	sig
Cognitive Styles And Reading Mark	0.67	0.001

9. DISCUSSIONS

The study found that there were more students among the participants were from FI cognitive style compared to FD. This finding was supported by Shunurul Haiza [12], Razman Mohd. Salleh [13] and Suryani Talib [14] but contradicted with Ramlah Jantan and Md. Nasir Masran [8]) and Meor Ibrahim [3], who found more students were from FD. The change may be due to many factors. There were many factors involved in developing the students cognitive style [3]. It maybe resulting from information technology (ICT) usage among the students during learning. Students nowadays were learning through internet and other media beside classroom. They always consult 'Mr. Google' to fill the gap of their understanding. We can conclude that there was a paradigm shift in cognitive style due to the teaching approach utilized by teacher such as through ICT and thinking-based teaching. The study also finds out that there were positive and significant correlation between students' cognitive style (FI) and their reading ability. This finding was supported by study done by Shunurul Haiza [12], Razman [13] and Suryani [14] but contradicted with Meor Ibrahim [3] who found no positive correlation between cognitive style and the students' achievement.

There was a tendency to correlate gender differences with cognitive style [6,7,8,20]. Poh Bee Theen and Melissa Ng [6] found that gender differences have a significant effect on cognitive style. Ramlah Jantan and Md. Nasir Masran [7] Ramlah Jantan [8] found the girls were more prone to FD cognitive style. Amani et al.[20] found that girls tend to think globally and this trait were associated with FD cognitive style. According to Ebrahimi, Zeynali and Dodman [21], the differences in cognitive style have affect on student learning grammar. Where the study found the FD students prefer inductive method of teaching grammar while FI students prefer deductive method.

Regarding learning using information technology (ICT), few studies found the FI benefit better than FD. Ahmad Rizal Madar dan Mohd Noor Hashim [23], Hasnah and colleague [24]; study the effect of "Web-based Guided Inquiry Approach" on the students' achievement from FI and FD cognitive style. They found that the FI student benefited by this approach and they got higher marks than FD Students.

10. CONCLUSION AND RECOMMENDATION

The study on cognitive style among primary school students are relatively new compared to secondary school and college students. Through the study, we found more students were from FI cognitive style and the finding contradicted with previous literature, Meor Ibrahim et al.[3], Ramlah Jantan & Md. Nasir Masran [7], and Ramlah Jantan [8]. So, many aspect of research regarding cognitive style among primary school students need to be explored. Even though finding of the study suggested there was positive correlation between cognitive style and reading achievement, the study have to be replicated because according to Witkin et al., (1977) the FI students preferred mathematics and science subjects than language. Finding by Ramlah and Md. Nasir [8], Meor Ibrahim et al., [3] and Amani [20] suggested that girls prone to have FD cognitive style. So, the issue is does FD cognitive style gender bias? Many aspects of the cognitive style among primary school students need to be explored. So, teacher have to stimulate the students to learn by observing their needs. According to Norasmah and colleague [24], effective learning method can draw students' interest and attention to the topic being taught. Interest is an effective nature and also the key factor that influences students to learn. Generally, our behaviors are influenced by cognitive and emotional characteristics and potentials that to predict behavior, such characteristic should be scrutinized [25]. So we recommend the principal of primary schools to monitor their teacher activity and remind the teacher to survey their students' cognitive style and their academic needs.

The Principal and teachers must discuss how to fulfill students' need based on their cognitive style. By doing so, the teachers will be able to build networking with the students and this would enhance the students' motivation to study. There is a need to understand, recognize, and develop each area of cognitive specialty. Creativity and effectiveness can be increased when the bipolar dimensions are fused [16].

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