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# Cognitive Map Ability of Elementary School Students In terms of Gender

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## ABSTRACT

*The present study aimed to find out the cognitive map ability difference between male and female students in Elementary School X in Malang City. The present study employed quantitative approach with comparative design. The subject of the study was 331 students, they were selected by using purposive sampling technique. The instrument of the study was achievement test. The data were analyzed using chi-square. The result of the study showed no difference in terms of cognitive map between male and female students. This may occur since the male and female students possessed equal opportunity and need to learn their school environment. Although gender did not emerge as a variable determining the difference of Cognitive Map ability, the aspect that still becomes the determiner of the individuals' cognitive map ability difference is experience, which the present study referred to Grade and Age difference. The higher the grade and the older the age, the better the cognitive map ability the elementary school students possessed. The school counselor can utilize the result of this study as a reference in developing guidance and counseling program for developing cognitive map ability for male and female elementary school students.*

*Keywords: cognitive map, gender, elementary school student*

## INTRODUCTION

Human development begins when they are still in the womb until they face death. Throughout life, human experiences some developmental stages; one of the stages is childhood. Childhood is one of the most crucial stages because it determines the future generation (Santrock, 2011).

Throughout the developmental period, children' cognition experience developments, cognitive aspect cannot be separated from

human being. Cognitive psychology is a discipline on cognition and mental process that become the basis of human behavior, it has some subdiscipline such as memory, learning, perception, and problem-solving (Ling et al., 2012).

Most of the schoolchildren are in early and middle childhood. Piaget (in McLeod, 2010) state that concrete operational stage is in the age of 7-11, this is usually called as middle childhood. In this stage, children

begin to be able to think concretely and logically.

Various cognitive aspects cannot be separated from human being. Environmental aspect emerges as one of the inseparable aspects of the cognitive process. The information transmitted to memory in the brain regarding environmental aspect is critical, it determines how someone perceive his surrounding, in its form, the memorable object can guide someone to find a direction from one place to another (Bell *et al.*, in Bratman, 2015). Besides, Bell *et al.* (Bratman, 2015) also state that someone's ability in capturing various information regarding his environment depends on how human being is capable of storing geographic information, Human presentation of information and organization of environmental environment is called as cognitive map.

Cognitive map becomes an essential aspect of human life. Every human being will always experience this aspect, especially when they understand their surroundings. Lynch in Wang *et al.* (2013) set out five aspects to describe and to analyze cognitive map. These aspects are paths, edges, district, nodes, and landmark.

Based on the background that is described above, this study was conducted to find out the cognitive map ability of elementary school students who are in concrete operational stage in terms of gender. The school counselor can utilize the result of this study as a reference in developing guidance and counseling program for developing cognitive map ability for male and female elementary school students.

## METHODS

The present study employs quantitative approach with comparative design. The subject of the study was 331 students, they were selected by using purposive sampling technique. The instrument of the study was achievement test. The data were analyzed using chi-square.

## RESULT AND DISCUSSION

The data were collected from the total subject of 331 students from 2nd grade until 6th grade based on the subject distribution according to gender, as it is shown in Table 1. According to their grade, as it is shown in Table 2, and according to age as it is shown in Table 3.

**Table 1.**

**Subject distribution in terms of Gender**

Gender	Total	Mean
Male	191	9.77
Female	140	10.39
Total	331	

**Table 2.**

**Subject distribution in terms of Grade**

	Total	Mean
Grade 2	112	8.62
Grade 3	75	9.69
Grade 4	80	11.15
Grade 5	64	11.52
Total	331	

**Table 3.**

**Subject distribution in terms of Age**

Age	Total	Mean
7	49	8.43
8	94	8.98
9	75	10.56
10	78	11.22
11	35	11.34
Total	331	

The hypothesis testing was done by using chi-square test for K independent sample, The chi-square count value of 10.461 with chi-square table value of df:11 (19.675) with significance level of 0.489 (>0.05). The chi-square count (10.461) was less than chi-square table (19.675), or the significance value was larger than alpha 0.489 (>0.05), accordingly, the null hypothesis is accepted. The contingency coefficient value was 0.175, it means that there is an insignificant correlation between gender and cognitive map ability.

Based on the hypothesis testing, it could be concluded that there is no evidence to reject the null hypothesis, in other words,

there is no difference of cognitive map ability between male and female elementary school students. The comparison of the mean score on the grade difference is shown in Table 2. It is found that the mean score of grade 2 is the lowest (mean=8.62) and the highest mean score is found in grade 5 (mean=11.52).

Table 3 shows that 7 years old children obtain the lowest mean score (mean=8.43) and 11 years old children obtain the highest mean score (mean=11.34). It was found that based on gender, there is no difference in cognitive map ability between male and female students in elementary school X in Malang. This result is consistent with the result of the study conducted by Zinser et al. (2004). Zinser et al. (2004) state that regarding gender difference in comprehending geographic condition of their surrounding, there is no difference between male and female in comprehending their environment, however, there is a significant difference related to their perception on larger environment such as urban area and other countries. It occurs because male and female students share equal opportunity to learn their campus environment; accordingly, there is no difference in it. However, male students possess a greater interest to learn geographic condition rather than female students do. This can also occur among the students of Elementary School X in Malang.

The result of this study is in contrast with the study conducted by Wang et al. (2013), they found that male and female students hold different cognitive map ability. This difference is affected by the concept of "Hunter-gatherer," according to Webbley P. Whalley A. (2001), This concept still refers to the gender difference stating that man is the one who works and woman is the one who keeps the house. Since the man is the one who works, he has a wider range rather than a woman does. As a result, children imitate what their parents do.

Another study is in agreement with Wang et al. (2013), it is stated that man can describe his surrounding more specifically

than woman due to his wider range (Kapil and Roy in Ozkan and Somaz, 2015). Children who were born after 2000, or are usually called as Generation Z, holds different value in addressing gender difference. Their value views that there is no difference between man and women, especially regarding occupation. The previous generations believe that it is forbidden for a woman to work, yet Generation Z does not view gender as a limit for someone to get a job anymore (Ozkan and Solmaz, 2015). This leads to the increase of woman range, which possibly affects her cognitive map ability.

Although gender does not emerge as the factor distinguishing someone's cognitive map ability, the present study found that children' grade and age determine the difference of cognitive map. Grade and age difference is closely related to children' experience, normally, the higher the grade and the older the age, the longer they live in that environment, the more the experience they possess in a certain environment. Based on the result of the analysis, it was found that the mean score obtained by grade 2-5 and children aged 7-11 years old increases, It means that the longer a child study in the elementary school, the better their cognitive map will be. Therefore, the higher the grade of a child, the better his cognitive map skill, the same also works for age difference. Some scholars found that the more the children are familiar with an environment, the more accurate and detail their cognitive map is. A study conducted by Bell and Wood (Bell et al.,1996) found that citizen who has lived for three until seven years can draw a map better than the map made by the foreigners. This indicates that the longer someone stays in a certain environment, the more he understands his environment, and the better their cognitive map for that area.

There is a change in information processing during middle childhood; that change is related to memory. Children' information processing, particularly in long

term memory, will keep growing according to the middle childhood period, the improvement of children' memory also represent their improved knowledge (Santrock, 2011). According to Block & Pressley (Santrock, 2011), long-term memory highly depends on learning activity participated by individuals during learning and reminding information. In this case, children' cognitive map ability for their environment are substantially affected by how the children process the information from his surrounding and are stored in the memory.

When comparing the mean score of cognitive map aspect district obtain the highest score ( $M=0.82$ ), and Nodes obtain the lowest score ( $M=0.56$ ). Based on the finding, it was found that the students possess better cognitive map ability in the aspect of the district and less good in the nodes aspect. The district is an aspect that refers to an area with the same environmental condition, while nodes refer to a meeting point between one path and another. This can be caused by students' activity; students perform their activities more often in the school area and pay less attention to the nodes at school. According to Garling (Wardani, 2015), Activity is one of the most important matters to form someone's cognitive map since by carrying out an activity in a certain place, he will know directions and anything in the environment, as a result, an accurate cognitive map on his environment is formed.

Cognitive map ability becomes a crucial aspect for a child, without cognitive map, a child cannot understand his environment (Wang et al., 2013). By cognitive map, a child will know where he is and know where to go. For instance, when a child is in a class he wants to go to the field, with a good cognitive map about his school, he will be able to find out the direction he should go and know about anything he will pass.

Every individual possesses the ability to present his environment. Aqli (2004) explains some factors affecting someone's cognitive map; one of them is gender difference. Man

can draw complete and detail map, including the north-south properly. (Harrer et al., 2000). Gender difference becomes a determining aspect because man possesses more resources that assist the formation of map and direction in his social activity (Lawton, 1994). Gender difference in someone's cognitive map ability does not only affect to the elder, but gender difference also becomes the aspect of forming cognitive map. The boys are able to draw his environment more detail rather than the girls with equal range (Webley and Whalley's, 2001). This is caused by different activity done by boys and girl. Wang et al. (2013), cognitive map ability difference between boys and girl in a Chinese village because boys and girls understand the social difference. They adhere to the concept of "Hunter-Gatherer" where man is the one who works so that children in that village follow that concept. This also affect the boys' activity, they have wider range to explore their village rather than the girls do.

## CONCLUSION

The result of the study showed that there is no difference between male and female students on their cognitive map ability on the students in elementary school in Malang. However, there are other aspects affecting subject's cognitive map development, namely, grade and age, the higher the grade and the older the age, the better their cognitive map ability.

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