The Student’s Spatial Intelligence Level in Senior High School

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Abstract. The research is trying to reveal the level of state senior high students’ spatial in Bandung, Indonesia. The level is elaborated in detail by using six indicators. All indicators are discussed comprehensively in order to get a good result. The technique of analyses in this research uses percentage and it is described in details. The result of the spatial intelligence shows that 45.36 % is very high, 46.39% is high, 7.22 % is average and 1.03 % is low.

1. Introduction
Intelligence is a gift blessed from God. Intelligence is human competence to understand something and to express his own idea. One of the intelligences mainly focused nowadays is multiple intelligence in which spatial intelligence involved [1]. Spatial intelligence is a competence to perceive visual word accurately, to transform and modify someone’s visual experience even when there is no relevant physical response. This spatial intelligence covers a competence to imagine, to represent idea visual spatially, to self orient accurately. Spatial intelligence specifically refers to someone’s competence in acknowledging and understanding their environment [2]. Spatial intelligence is a result from a cognitive process managed by human’s thought. Cognitive can be referred to thinking process that is someone’s skill and competence to correlate, to value and to consider an event so that he or she can draw a conclusion and to choose a right action to do. Everyone has a spatial intelligence but the quality can be various in accordance with habits and exercises that they do. Thinking about space is the main capital in understanding an area by possessing a sufficient space intelligence supported by a good area information someone can know and anticipate an event which can happen in that area [3].

Students possessing this intelligence will tend to create shape imagination in his own brain or a competence to create three dimension shapes which commonly find in adult statue sculpture or architect. Spatial intelligence, when it is related to geography, it will discuss space interaction. Space interaction is a correlation between human and the area where he lives in, interaction between human or people to their environment with their own knowledge, and it is one of the main characteristic of space interaction [4]. Students with this intelligence will tend to create the imagination of the form in their minds or the ability to create three-dimensional forms as encountered in adults who become sculptors or architects. A child who has Spatial Intelligence will find it easier to find objects or places in a particular area [5]. Spatial intelligence when in association with geography it will discuss about spatial interactions. This spatial interaction is the cohesiveness between humans and also their residence areas, the interaction between humans or the population against its territory with its own knowledge is one of the characteristics of spatial interaction [6].

A competence to understand space intelligence is very important in geography because when understanding geography material will require sensitiveness for a space due to geography discuss
about geosphere phenomenon by using space approach. Therefore, everything studied in geography must be a part of space. The importance of spatial intelligence in geography learning is required to understand by teachers to give learning process enable for students especially for IPS or IIS (Social Sciences Program. Geography explains the geosphere phenomenon which is analyzed in spatial context. The seminar and workshop held in Semarang, 1988 stated that geography is the science that learns the similarities and the differences of geosphere phenomenon based on the spatial context area. Therefore, learning geography will enhance the students’ spatial intelligence compared with the students who do not learn Geography, even spatial intelligence will aid in learning Geography. The objective of the writer is to measure students’ spatial intelligence level in SMAN in Kota Bandung so that it can be used as reference for teacher in giving Geography instruction at school.

2. Methods
Research method is an important thing because research quality depends on effective and suitable method so that it can result in right answers to formulated problems. Method is a way to conduct research depending on the characteristic of the problems being studied [7]. The method applied in this research is qualitative descriptive. Qualitative research is a method to test certain theory by examining the relationship between variables [8]. The technique of data analyses applied is percentage. This percentage technique tries to find out the percentage of spatial intelligence competence from some item tests given to show a certain score. This score becomes a standard of low and high students’ spatial intelligence. On the other hand the method of collecting data uses survey method. Survey method is a method to describe the characteristic of population by using sample [9]. The chosen population is all the students at grade X and XI SMAN Kota Bandung. The sample which is taken from ninety seven, divided into eight areas. The eight areas are based on the zone of PPDB in Kota Bandung (See figure 1).

![Figure 1. Zoning of sampling.](image-url)
3. Results and Discussion

3.1. Memorizing their own environment
Memory is one of the important things in human intelligence environment. Memorizing the environment or the place where the students live is an indicator of good spatial intelligence level. By memorizing the environment where they live in, the students will know and understand deeply the environment. The result of the research can be shown in table 1.

Table 1. Memorizing their own environment.

| Result       | Amount | Percentage |
|--------------|--------|------------|
| Remember     | 51     | 52,58      |
| Not Remember | 46     | 47,42      |
| Amount       | 97     | 100,00     |

Source: Data processing, 2017

Most of the students answer that they remember the item test given. It indicates that most students know and understand their environment well. This is presented by most of them still remember natural disasters which happened in the previous five years. The students are able to acknowledge and remember the object that they passed by from house to school. Therefore, most of the students are able to solve the problems which exist because they know and remember their environment well. Possessing high memory and supported by competence of other spatial intelligence will make all spatial problems can be passed easily.

3.2. Memorizing a place clearly
Memorizing a place they have ever visited well is the characteristic of the students who possess good spatial intelligence competence. The number questions have been given to them to measure their memory about the places in their environment. To be more clearly it can be studied in table 2.

Table 2. Memorizing a place clearly.

| Result   | Amount | Percentage |
|----------|--------|------------|
| Good     | 83     | 85,57      |
| Enough   | 13     | 13,40      |
| Deficient| 1      | 1,03       |
| Amount   | 97     | 100,00     |

Source: Data processing, 2017

Table 2 shows that almost all students possess a good level of remembering of places in two item test given. This one proves that only a few of them possess less competence in memorizing. In this part the questions related to the students’ memory about crowded area and the places they passed by from house to school were given. The result is most of them are able to memorize and mention the places in detail from house to school. This proves that the students in that part poses of good spatial intelligence.

3.3. Good at orientation direction
Recognizing direction well is one of the indicators of someone who possess a good spatial intelligence. Sometime everyone will feel disorientation direction but this rarely happens to anyone who poses high level of spatial intelligence. To see the competence of students’ orientation who study in SMAN Bandung can be seen at table 3.

Table 3. Good at orientation direction.

| Result   | Amount | Percentage |
|----------|--------|------------|
| Good     | 58     | 59,79      |
| Enough   | 33     | 34,02      |
| Deficient| 6      | 6,19       |
| Amount   | 97     | 100,00     |

Source: Data processing, 2017
After the students were given the test of reading competence and know the direction of the students who live in Bandung, the result shows that most respondents possess the level of orientation direction and recognize the direction well. This test consists of pictures, such as sketch, and the instruction is to find out a place based on the direction given. The objective of the test is to know the level students’ competence to direction. The result can be seen in table 3. On higher level spatial intelligence is reading map. Adequate understanding about direction is not important thing because a direct relationship by finding an object on the map itself.

3.4. Able to know an object and find the way out
Acknowledging an object, identifying a problem in an area, and finding a solution for that problem can be done easily by someone who possesses high spatial intelligence. There are so many people who know a problem in area but they do not take a useful solution to overcome a problem. After given a test about the problem, the result can be shown in table 4.

| Table 4. Able to know an object and find the way out. |
|------------------------------------------------------|
| Result | Amount | Percentage |
|--------|--------|------------|
| Able   | 66     | 68.04      |
| Unable | 31     | 31.96      |
| Amount | 97     | 100.00     |

Source: Data processing, 2017

The Research finding after given the test about an object and find out solutions, more than a half of them are able to identify the object even find out the solution when there is a problem in their area. It means that the students have competencies to overcome spatial problems happened in their daily life. They also can find right solution for the existing problems, but these competencies must be studied and trained to strengthen these competencies.

3.5. Able to differentiate shape
Other indicator to measure spatial intelligence is differentiating shape. Someone or student are asked to differentiate shape on different objects on a piece of paper. The function of the test is to measure student’s competence in differentiating shapes of every object as an indicator of intelligence spatial. After given the test of differentiating shape competence, students’ intelligence level in differentiating the various objects can be identified. The result of the test can be shown in table 5.

| Table 5. Able to differentiate shape. |
|--------------------------------------|
| Result | Amount | Percentage |
|--------|--------|------------|
| Good   | 62     | 63.92      |
| Enough | 33     | 34.02      |
| Deficient | 2 | 2.06      |
| Amount | 97     | 100.00     |

Source: Data processing, 2017

The result indicates that half of the respondents have a good competence in differentiating shape. It means that respondents with good differentiating shape competence will easily interpret senses if it is correlated with distant senses. If is correlated with reading map with students’ differentiating shape competence, they will easily read thematic maps which use many shapes.

3.6. Able to analyze spatial phenomena
One of competencies identical with spatial intelligence is a competence to analyze a spatial phenomenon. Someone with adequate competence in reading spatial phenomena, he tends to have competence to possess significant or higher spatial intelligence level. The result can be shown in table 6.
The students’ competence to analyze the space phenomena in SMAN, public high schools, Bandung is very high. This conclusion is based on the result of the test that most of the students are able to analyze space phenomena which often happens in their environment. On this high level space phenomena analyses, the students are easily able to know and explain complicated geography phenomena into simpler one. Geography itself is the science that studies space phenomena.

3.7. Measuring spatial intelligence level

The level of spatial intelligence level is obtained after testing the six parameters or indicators as measurement material. The six indicators are calculated and the result can be shown in Table 7.

| Interval         | Category    | Percentage % |
|------------------|-------------|--------------|
| 81 % - 100 %     | Very High   | 45.36        |
| 61 % - 80 %      | High        | 46.39        |
| 41 % - 60 %      | Good Enough | 7.22         |
| 21 % - 40 %      | Low         | 1.03         |
| 0 % - 20 %       | Very Low    | 0.00         |

Spatial intelligence is the competence to understand an area. In this case, this competence can facilitate in learning geography since geography itself is based on location and area. Students’ spatial intelligence in Bandung can be categorized into high level because almost all of respondents involved in the research possess spatial intelligence belong to very high and high level. The good level spatial intelligence can be very useful for learning geography if it is developed properly by the teacher and it can facilitate the students in understanding and solving the problems or geography phenomena in their environment or their area. The approval of students’ spatial intelligence in Kota Bandung is indicated by the result of the research which shows 45.36 % is very high, 46.39 % is high.

The spatial intelligence will be different for each single person. The difference is influenced by some factors such as, genetic, social and economic background, environment, physical condition, and emotional structure [10]. The fifth factors influence the high or low level of a person’s spatial intelligence. The better the fifth factors exist, the higher the spatial intelligence will be. Basically, the high student’s spatial intelligence is caused by a good spatial its self. The indicator or the sign of spatial intelligence is the sign of high or low spatial intelligence. There many indicators about someone who shows high spatial intelligence; being aware of their environment, memorizing their place clearly, looking out of the window frequently when they are in the car, being artistic and having full of ideas, being able to visualize what they think about and what they listen to, creative, good at playing chess, card and puzzle, being able to differentiate shapes, being able to describe what they see, being able to play musical instrument, being able to analyze pictures in detail, good at orientation direction, being able to transfer statistic, being able to use metaphor

4. Conclusions

Students’ spatial intelligence in public senior high schools in Bandung is high. It is about 45.36% students show very high, and 46.39 % is high. The result is obtained from the students who are given a test and each indicator of the test is reached very high. This shows that students’ capacity in understanding geography is very high and it depends on teachers to maximize their capacity.
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