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# CONDITION OF SPATIAL LITERACY AND STUDENTS' SPATIAL THINKING ABILITY IN MASTERING THE USE OF MAPS AT STATE SENIOR HIGH SCHOOL

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**Abstract** The aim of this research is to determine students' literacy conditions, spatial thinking abilities, and mastery of map use. The research was conducted at SMAN 3 Depok using quantitative research methods. The data collection technique in this study used a questionnaire. The research population was 168 students of class XI SMAN 3 Depok. It is necessary to have sharp research indicators in each aspect of spatial literacy, spatial thinking skills, and mastery of map use, and it is necessary to have in-depth analysis-synthesis related to the interconnectedness of each aspect of map use, spatial literacy, and spatial thinking skills Research Results: SMAN 3 Depok students have a high level of ability in spatial literacy and map use, moderate ability in spatial thinking ability, and mastery of map use. High spatial literacy skills can be the basis for developing spatial thinking skills through map media in geography learning.

**Keywords** Geography, Maps, Spatial Literacy. Spatial Thinking Skills.

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## INTRODUCTION

Geography is a science that studies all human and natural activities and the interactions between the two through a spatial perspective to form a certain spatial pattern. Geography subjects are studied at the junior high and high school levels. Geography subjects form and improve students' understanding of the organization and spatial variations of society, places, and the environment on Earth. When students are interested in geography subjects, they will show behavior such as enthusiasm in following learning, feeling happy and comfortable, and paying more attention to the geography subjects they are interested in. In learning, students have differences in terms of interests, personality, or motivation that students have (Azizah et al., 2022). Spatial thinking is an important characteristic of geography learning activities. The study of geographic phenomena is not only about explaining the existence of a phenomenon and the process of the phenomenon occurring on the earth's surface but also the shape, size, direction, and pattern of the phenomenon and its relationship to other phenomena. This ability will be very useful for students when determining or making decisions about very simple and complex things related to space or location (Setiawan, 2016).

Geography subjects are studied at the junior high and senior high school levels. Geography subjects shape and enhance students' understanding of the organization and spatial variation of society, places, and environments on Earth. In the context of geography education, the facts show that the condition of geography learning that takes place in Indonesian schools from elementary to secondary levels tends to memorize concepts (names of rivers, lakes, countries, capitals, and so on). This can be seen from the textbooks circulating on the market and used by teachers and students in learning, which are dominated by facts/data, and the concepts of the textbooks do not direct students to think critically and analytically (Azizah et al., 2022) This makes geography learning that takes place in schools uninteresting for students. The value of geography learning outcomes is sometimes almost the same as mathematics, which is relatively low, and on the other hand, the tendency of geography teachers to teach is limited to understanding the concepts and theories of supporting sciences of geography (Aksa, 2019).

Along with the desire to achieve the objectives of geography learning, it seems that it is still very difficult to realize it properly. This is inseparable from the role of teachers who still lack professional competence in teaching and managing classes. Conditions like this occur in schools in general. To advance the quality of learning both in terms of mastery of material and learning methods, teachers always try to increase student interest in geography subjects. In the learning

process in the classroom, there is interaction between students and teachers, teachers and students, or student interaction in learning. The role of the teacher determines the effectiveness and efficiency of learning activities. Teachers have many roles in implementing learning (Azizah et al., 2022). Teachers have roles as teachers, motivators, mediators, class managers, participants, and evaluators. In carrying out their duties and roles, a teacher must have these abilities. If teachers can carry out their duties and roles well, then teachers can be said to be professional. Teachers are required to always be ready to adapt various teaching techniques and methods for various students with different backgrounds, talents, abilities, and needs, which are now better known as differentiated learning. Differentiated learning is a process for effective teaching by providing a variety of ways to understand new information for all students in their diverse classroom community (Fitriana & Lestari, 2022).

The results of the odd semester Geography test at SMAN 3 Kota Depok reached an average of 58.85 and 66.83 for class XI. The results of the study at SMAN 1 Bae Kudus on the ability to use maps showed that the average score was 69, and for images, it reached an average of 67. Meanwhile, the results of the study at state high schools in Medan City on the ability to read maps measured through 10 indicators showed that the average score for the indicator achievement was still relatively low (49.98). This means that more than half of the questions cannot be answered properly. (Prameswari et al., 2019). The basic knowledge of geography as one of the basic competencies is still considered a stand-alone basic competency (KD), not connected to the phenomena of the geosphere, and still limited to what is written in the sourcebook. In the classroom, geography learning has not touched on the analysis of symptoms of phenomena that occur in the immediate environment, both physically and socially. This results in the low curiosity of students about the phenomena of the geosphere that occur around their environment. For example, puddles/floods after rain take quite a long time to recede. This is just a spectacle and does not raise questions for students as to why this happens.

On the other hand, in the current era of the Industrial Revolution 4.0, geography education is able to prepare high school students to face competition and challenges to improve their abilities, namely spatial thinking skills (Aliman et al., 2018). Geosphere phenomena such as tsunamis, storms, earthquakes, and others are very quickly obtained information either through television or the internet. This makes it easier for teachers to get learning media that can be a stimulus so that it can arouse students' curiosity. The above phenomenon can be a problem that must be studied so that

students are motivated to think of alternatives to solving environmental problems that emphasize spatial aspects that encourage spatial thinking skills (Isnaini et al., 2023). Through geography learning, it is hoped that it will further open students' horizons that learning geography is not just about memorizing but fosters a sense of concern for the environment (Alfiyatirrohmah et al., 2019). In addition to emphasizing the spatial literacy aspect it can train students' spatial thinking where the environment is a supporting force for human survival that needs to be preserved in the geosphere environment, both physical and social phenomena. Studying the geosphere phenomenon through a geographical approach creates problem-solving efforts that can increase concern for space or the environment in addition to fostering an attitude of love for the homeland (Furqan et al., 2020).

In responding to the resolution of problems of geospheric phenomena/symptoms, both physical and social, geography teachers are expected to be able to foster students' spatial thinking skills. For example, to identify tsunami-prone areas due to tectonic earthquakes, students must understand spatial concepts such as location, distance/proximity, and elevation, using representation tools such as maps, graphs, diagrams, and terrain modeling, and reasoning processes, such as cognitive strategies, to facilitate problem-solving, decision making to formulate problems, find answers, and express solutions to problems, and various problems that are the subject of geography in relation to the implementation of the Independent Curriculum learning in schools require spatial literacy that will encourage the building of spatial understanding and students' spatial thinking skills so that they are able to describe geographical objects on the earth's surface including students' mastery of maps. (Purwanto et al., 2023). Spatial literacy includes the individual's capacity to record and convey knowledge effectively using maps, understand and identify the world around them using visual representations, and distinguish patterns (Sugiarto et al., 2023).

The teaching and learning process for geography subjects carried out by teachers currently still uses very simple media in learning about maps, namely by spreading maps on the blackboard wall. With very small images and many overlapping symbols and texts on one map, it is very difficult for students to understand the material about the map of Indonesia. Learning through map media can be done through the development of web-based geography learning media, to be accessed online in the form of text, images, and simulations, which are expected to optimize student learning outcomes in geography subjects (Purnama & Aminuddin, 2023).

Several studies on spatial literacy in geography subjects, namely regarding students' spatial thinking skills in geography learning, carried out face-to-face related to students who have high and moderate learning abilities (Sirri et al., 2021). The role of Geographic Information Systems (GIS) in improving spatial thinking skills (Setiawan, 2016), the results of the study conveyed that geography learning through spatial thinking makes geography more interesting both for educators and especially for students. Students' spatial thinking ability in Geography learning in Senior High School students with samples of grades X, XI, and XII using maps and remote sensing imagery in tests (Saputro et al., 2020), and students' spatial thinking ability in Geography learning in Senior High School students with samples of grades X, XI, and XII majoring in Social Studies using the Earth Comm learning model (Nisa et al., 2021).

Referring to the studies, this study aims to analyze students' spatial thinking skills, it is necessary to set specific objectives for the development of material on basic geographic concepts and map knowledge. To strengthen spatial thinking skills, it is also necessary to design activities that involve the use of maps and remote sensing imagery. In addition, using various learning strategies such as lectures, discussions, practicums and the use of various media in delivering learning materials. The next step taken after learning is to design an assessment instrument that includes aspects of understanding geographic concepts as well as analytical and interpretation skills using maps, such as conducting pre-tests and post-tests to monitor student progress and assess the effectiveness of learning. Test results can be analyzed to provide feedback to students on their progress in developing spatial literacy and spatial thinking skills, as well as adjusting learning approaches based on student responses and evaluation results to improve learning effectiveness. The final stage is an overall evaluation of the learning process to identify successes and areas of improvement in developing students' spatial thinking skills using maps. The thinking framework can be seen in the following figure:

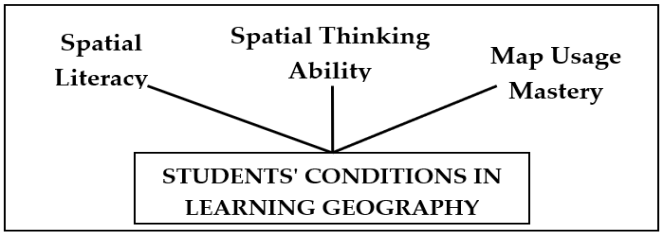


**Figure 1.** Framework of Thinking

Various problems that are studied in geography in relation to the implementation of Independent Curriculum learning in schools require spatial literacy that will encourage the building of spatial understanding and students' spatial thinking skills so that they are able to describe geographical objects on the earth's surface including students' mastery of maps. In 2024, SMAN 3 Depok City implemented the Independent curriculum and received grade A accreditation with a score of 96 (2021 accreditation extension certificate) from BAN-S/M (National Accreditation Board-Schools/Madrasahs). SMAN 3 Depok City has 34 study groups with a total of 1305 students with 88 Educators and Education Personnel.

As a school that has implemented the Independent Curriculum, the demands, and development of spatial literacy and spatial thinking skills in students, especially for geography subjects, are very important to be implemented at SMAN 3 Depok. Therefore, this study was conducted at SMAN 3 Depok with the aim of analyzing spatial literacy and spatial thinking skills through the use of map mastery in geography subjects.

## METHOD

The research method in this study uses a quantitative approach with data collection techniques through questionnaires. The research was conducted at SMAN 3 Kota Depok. The research population was 168 students of class XI SMAN 3 Depok. The details of the population can be seen in Table 1 below:

**Table 1.** Population Condition of SMAN 3 Depok

| No | Class | Total |
|---|---|---|
| 1. | XI – 8 | 42 people |
| 2. | XI – 9 | 42 people |
| 3. | XI –10 | 42 people |
| 4. | XI – 11 | 42 people |
| | Jumlah | **168 people** |

Source: Research data, 2024

### *Measurement Test*

The model at this stage is carried out to test the construct validity and reliability of each indicator. The entire population in this study was used as a sample, so this study is called a population study taken from classes XI-8, XI-9, XI-10, and XI-11 with a total of 168 students. The instrument used in this study is a test question as a primary data source. The test and questionnaire instruments will be made in the form of a google form so that they are easily accessible to students. While secondary data is obtained through literature studies and data relevant to the study. The

following is a grid of spatial literacy research:

**Table 2.** Spatial Literacy Research Grid

| No. | Spatial literacy indicators | Question indicator | Question number and Question | Answer options |
|---|---|---|---|---|
| 1. | Data/tabel | Understanding information in data/table form | 1. I can easily understand information in data/table form. | Master (3)<br>Less Mastery (2)<br>Not Mastery (1) |
| 2. | Images, Photos, Graphics | Explaining phenomena with pictures, photos, or infographics | 2. I prefer to create and read presentations in the form of images/photos, data tables, and graphs. | Master (3)<br>Less Mastery (2)<br>Not Mastery (1) |
| 3. | Infographics | Explaining phenomena with pictures, photos, or infographics | 3. I understand information in graphic form (infographics) better than narrative. | Master (3)<br>Less Mastery (2)<br>Not Mastery (1) |
| 4. | General map | Understanding the map | 4. I understand all the components on the map | Master (3)<br>Less Mastery (2)<br>Not Mastery (1) |
| 5. | Thematic maps | Understanding thematic maps | 5. I am able to read general maps and thematic maps/special maps. | Master (3)<br>Less Mastery (2)<br>Not Mastery (1) |
| 6. | Orientation | Show location | 6. If I go somewhere, I can memorize the directions and street names of that place. | Master (3)<br>Less Mastery (2)<br>Not Mastery (1) |
| 7. | Orientation | Understanding territorial boundaries | 7. With a map, I am able to explain the boundaries of a region/place. | Master (3)<br>Less Mastery (2)<br>Not Mastery (1) |
| 8. | Coordinate | Show location | 8. I can easily find the location of a place with the help of a map. | Master (3)<br>Less Mastery (2)<br>Not Mastery (1) |
| 9. | Floor Plan | Create a floor plan | 9. I can make a map of my house | Master (3)<br>Less Mastery (2)<br>Not Mastery (1) |
| 10. | Distance | Estimating distance | 10. I can estimate the distance from my house to the place I am going to. | Master (3)<br>Less Mastery (2)<br>Not Mastery (1) |
| 11. | Map scale | Understanding the function of map scale | 11. I am able to calculate the distance from one place to another using a map. | Master (3)<br>Less Mastery (2)<br>Not Mastery (1) |
| 12. | Comparing Phenomena | Understanding the differences and similarities of phenomena | 12. I often compare phenomena that occur in one region with other regions. | Master (3)<br>Less Mastery (2)<br>Not Mastery (1) |
| 13. | Slope visualization | Analyzing slope conditions | 13. I am able to explain the slope conditions on topographic/landform maps or contour maps. | Master (3)<br>Less Mastery (2)<br>Not Mastery (1) |
| 14. | Geographical | Analyzing | 14. With the help of | Master (3) |

| | | | | |
|---|---|---|---|---|
| | conditions | geographical conditions | several thematic maps, such as slope maps, flood hazard maps, and rainfall maps, I am able to explain the conditions in an area. | Less Mastery (2)<br>Not Mastery (1) |
| 15. | Overlay | Analyzing industrial locations | 15. With the help of several maps, such as population density maps, population income maps, and land use maps, I can determine the right industrial location plan. | Master (3)<br>Less Mastery (2)<br>Not Mastery (1) |

Source: Research data, 2024

**Table 3.** Assessment Scale

| Assessment criteria | Assessment Scale |
|---|---|
| Satisfying | 3 |
| Less satisfactory | 2 |
| Not satisfactory | 1 |

Source: Research data, 2024

To measure the level of student mastery in using maps, 10 (ten) indicators are used, namely determining the title, scale, symbol, color, writing method, orientation, coordinate lines, legend, and inset. The spatial thinking ability data is known by using a multiple-choice ability test. Indicators of spatial thinking ability indicators of spatial thinking ability (spatial thinking) are comparison, aura, region, hierarchy, transition, analogy, pattern, and association. The following is a grid of spatial thinking ability indicators:

**Table 4.** Spatial Thinking Ability Question Grid

| Variables | Sub Variables | Question indicator | No. Question |
|---|---|---|---|
| Student skills in spatial thinking skills using maps | Spasial visualication | Students can determine map components | 1 |
| | Spatial Relation | Students can calculate the distance between regions and map scales. | 2, 16 |
| | Spatial Relation | Students can identify phenomena that influence the relationship between places on a map. | 10 |
| | Spasial Visualication | Students determine the symbols on the map | 3, 4, 12 |
| | Spatial Orientation | Students can identify areas based on orientation on a map. | 15 |
| | Spatial Orientation | Students can determine the magnitude of orientation | 13 |
| | Hierarchy | Students can determine the places shown on the map based on certain levels. | - |
| | Transition | Students can analyze the symptoms of changes in an area depicted on a map. | 6, 15, 19 |
| | Comparison | Students can determine locations that have | 9, 11 |

| | | |
|---|---|---|
| | similarities and differences in geographic phenomena on a map. | |
| Analogy | Students can analyze the physical conditions of a place that is far away but has the same characteristics and conditions. | 18, 20 |
| Aura | Students can identify cause-and-effect relationships regarding phenomena or symptoms depicted on maps. | 8 |
| Pattern | Students can identify geographical features on maps that have certain spatial patterns. | 7,14,17 |

Source: Author's research data, 2024

The data collection technique in this study used a questionnaire in the form of a multiple-choice test containing eight indicators of spatial thinking ability and consisting of 20 multiple-choice questions, a map use mastery test of 10 indicators consisting of 20 multiple-choice questions. Some questions were modified by the author because after analyzing the questions, there were bad questions that had to be discarded.

***Model Structural Test***

The objective at this stage is to determine whether or not there is an influence between variables between the constructs being measured, and a scoring process is carried out and then analyzed descriptively quantitatively in the form of a percentage.

## FINDINGS AND DISCUSSION

### Findings

The number of respondents in this study was 168 students from grade XI at SMAN 3 Depok. The following is the data on the results of spatial literacy tests, spatial thinking skills, and mastery of map use of all respondents. The data above shows that the enthusiasm of respondents, in this case students in Class XI, is relatively high, making it possible to obtain optimal research results (data).

The following is a description of the test results obtained from the average aspects of spatial literacy, spatial thinking ability aspects, and aspects of mastery of map use as follows:

**Table 5.** Average Scores of Spatial Literacy Test, Spatial Thinking Ability and Mastery of Map Use

| No | Test Questions | Average |
|---|---|---|
| 1. | Spatial literacy | 7,83 |
| 2. | Spatial Thinking Ability | 4,52 |
| 3. | Map Usage Mastery | 6,23 |

Source: Author's research data, 2024

Questions were given to students via G_form to 4 classes, grade XI students with a total of 168 students, who received Geography subjects. The average spatial literacy was 7.83 at a high level, while the spatial thinking ability of 4.52 was still at a low level, and for the average Mastery of map use, 6.23 was still at a moderate level. When compared per level, the following results were obtained:

**Table 6**. Comparison of Test Results

| No | Level | Spatial literacy | % Spatial Thinking Ability | Map Usage Mastery |
|---|---|---|---|---|
| 1. | 0 - 33,33 (Low) | 0,00% | 21,43% | 7,14% |
| 2. | 33,34 - 66,66 (Medium) | 5,36% | 73,81% | 47,02% |
| 3. | 66,67 - 100 (High) | 94,64% | 4,76% | 45,83% |

Source: Author's research data, 2024

In the spatial thinking ability test, many students were at a low level, and in the literacy questionnaire, none reached a low level. While at the medium level, the most were the results of the spatial thinking ability test, while the lowest at the medium level were the results of the spatial literacy questionnaire. At the high level, the most were the results of the spatial literacy questionnaire, while the least at the high level were the results of the spatial thinking ability test.

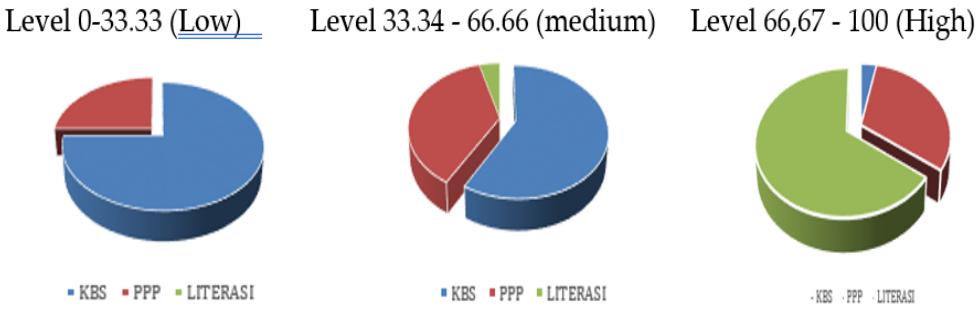


**Figure 2.** Comparison of Spatial Literacy Test Results, Spatial Thinking Skills, and Map Use Mastery in Students of SMAN 3 Depok City (Source: Research data, 2024)

Students who meet the criteria for high spatial thinking ability are only seven students (4.22%), and of the seven students, only two students whose map use mastery scores are in the medium criteria. At the same time, students who scored high criteria on the map useability test are 74 students (44.58%) and their spatial thinking ability were included in the high criteria only five students.

**Discussion**

Spatial literacy is related to the cognitive or thinking process of an individual. Spatial literacy is a person's perception and understanding of spatial objects and the relationships between spatial objects; a person involves mental activities to observe, manipulate, construct, represent, transform, interpret, and communicate two-dimensional or three-dimensional objects and is an important component for someone to develop. Spatial literacy has three domains, namely visualization, reasoning, and communication. Students who have spatial literacy are usually able to visualize spatial objects, reason about the properties and relationships between spatial objects, and communicate and receive information about objects and spatial relationships (Bednarz & Kemp, 2011).

Spatial intelligence or spatial literacy is an ability to understand, think visually and also process. Every individual who has this ability can translate the images in their minds into 2 or 3 dimensions. Therefore, spatial literacy must be developed through the education sector. Spatial intelligence tests can include orientation, understanding map data, graphic data, slope visualization, overlay, visualization of 3D images, 2D data, and representation of specific geographic characteristics. Spatial literacy or intelligence as a specific geographic characteristic and sovereignty of Indonesia's territory can be applied in innovative geography education (Marlyono & Urfan, 2019).

**Table 7.** Spatial Literacy Indicators

| No. | Spatial literacy indicators | Example |
|---|---|---|
| 1. | Data/tables, graphs, diagrams, infographics | Understanding information in the form of data/tables, images, photos, infographics |
| 2. | General map | Understanding how to read general maps and thematic maps |
| 3. | Orientation, location | Shows location, boundaries, coordinates |
| 4. | Floor Plan | Create a floor plan |
| 5. | Distance, map scale | Estimating distance, understanding the function of map scale |
| 6. | Comparing Phenomena | Understanding the differences and similarities of geosphere phenomena |
| 7. | Slope visualization | Analyzing slope conditions |
| 8. | Overlay | Analyze geographical conditions, industrial locations |

Spatial thinking ability is the ability to recognize space and is a strong focus in geography education (Flynn, 2018), helping students understand the core of geography material (Amaluddin et al., 2019), namely understanding the phenomena of the geosphere and the ability of a person's thinking power/process in recognizing, knowing, understanding, explaining, describing, analyze, and drawing conclusions about the phenomena of the geosphere (Bednarz & Kemp, 2011).

Spatial thinking skills, if continuously developed, will encourage spatial thinking skills so that it is assumed to be able to create geography learning that increasingly equips students with critical spatial thinking skills. Geography learning must be directed using a scientific approach. Critical thinking and problem-solving skills are a person's way of thinking carefully and thoroughly without swallowing other people's opinions raw by reasoning, analyzing, and solving a problem by providing solutions (Aulia et al., 2023)So that it can increase insight or knowledge for students (Raden Adinda Zalfa et al., 2023).

Based on AAG (Association of American Geographers, 2008), there are eight components that are indicators of spatial thinking ability, namely comparison, aura, region, hierarchy, transition, analogy, pattern, and association. The definition of the eight components can be seen in the following table:

**Table 8**. Components of Spatial Thinking Ability

| No | Basic Indicators of Spatial Thinking Ability | Definition | Example |
|---|---|---|---|
| 1. | Comparison | Comparing places that have similarities and differences | Rainfall, income, satellite imagery, maps, graphs. |
| 2. | Aura | Shows the effects and characteristics of an area on adjacent areas. | Smoke from factories, noise from highways, land prices |
| 3. | Region | Identifying places that have similarities and classifying them as a single unit | Industrial area, Dieng plateau, river basin |
| 4. | Hierarchy | Shows places that fit the hierarchy within a set of areas | River Network, regional hierarchy (province, district, city, village) |
| 5. | Transition | Analyzing changes in places that occur suddenly, gradually, or irregularly | Analysis of rural-urban transition areas (rural-urban fringe), industrial zones with settlements |
| 6. | Analogy | Finding a place in another area that has the same position and has similar conditions | Finding volcanoes that are far apart but have similar eruption types |
| 7. | Pattern | Describes the pattern or structure of a phenomenon or condition in a region. | Linear, radial, river flow pattern settlements |
| 8. | Association | Predicting a pair of symptoms that have a tendency to occur together in the same location. | Spread of pandemic disease outbreaks, weather and climate phenomena |

Sumber: Association of American Geographers, 2008

Classification of spatial thinking ability levels referring to research by (Putri et al., 2023).

**Table 9.** Classification of Spatial Thinking Ability Levels

| No. | Value Range | Spatial Thinking Ability Level |
|---|---|---|
| 1. | 0 - 33,33 | Low |
| 2. | 33, 33 – 66,66 | Medium |
| 3. | 66,67 – 100,00 | High |

Resource (Putri et al., 2023)

Geography is a field of science that studies the earth and its dynamics. In general, geography learning aims to realize students' attitudes and skills to develop analytical thinking skills in studying geosphere phenomena, foster a sense of love for the homeland, appreciate the existence of other countries, and be able to face problems that arise as a result of interactions between humans and their environment. From these objectives, it is clear that geography education has a scope that analyzes geosphere phenomena carried out by humans in their environment, both physical and social environments that affect human life. The scope above cannot be separated from the natural and human aspects that are the objects of geography studies. These aspects are expressed in a space based on the principles of their distribution, relations, and chorology in this geography study, which can reveal the characteristics of a region that is different from other regions so that it reveals the existence of regions that are different from each other (Sari Nst et al., 2023).

Geography learning in schools is still one of the confusing problems in national education today. Its implementation is still limited to geographical knowledge derived from geographic auxiliary sciences, while the domain of skills, which are expected to be geographical skills, and the domain of geographical attitudes/values do not grow optimally. In the 21st century, the tendency of geography education is toward integrated geography, which directs the growth of critical attitudes and citizen responsibility toward complex problems, such as environmental, social, cultural, economic, and political problems (Sari Nst et al., 2023). These problems require study by looking at the perspective or way of thinking based on its spatial approach. Geography learning focuses on discussing how to study the earth by considering the perspective of geographical science and through spatial, environmental, and regional complex approaches. The geography learning process is closely related to skills, habits, visible behavior, suitability of discussion materials, and the length of the learning process, and in geography learning it can be assisted by map learning. The concept of map mastery in the sense of map learning is a conventional depiction of the earth's surface that is reduced according to its appearance from above. Maps are generally depicted on a flat plane and equipped with scales, orientations, and symbols. A map is a depiction of the earth's surface that is

reduced according to scale. In order to be understood by users or readers, maps must be given writing and symbols. According to the National Coordinating Agency for Surveys and Mapping (Bakosurtanal 2005), maps are a means for storing and presenting environmental condition data and are a source of information for planners and decision-makers at stages and levels of development. Maps have components that can be seen in the following image:


**Figure 3.** Map Components
Source: https://satupeta.jabarprov.go.id/thematic?map_type=layout&id=169

Map components consist of: 1) Map Title contains information on the map, 2) Border lines are lines located on the edge of the map, and the ends of each line meet the ends of the other line. 3) Astronomical or Coordinate Lines are useful for determining the location of a place on the edge of the map in the form of coordinate numbers in degrees, minutes, and seconds; 4) Map legend is a description of the symbols that are the key to understanding the map. While symbols are signs or images that represent the appearance on the earth's surface that is on the appearance map, 5) Map inset shows the position of the mapped area in relation to the surrounding area, which functions to explain between the area on the main map and other areas around it. For example, a Map of Java Island is the main map, so to see the position of Sumatra Island with other islands, a map of Indonesia is made as an inset.

Geography subjects are related to spatial, so It is necessary to make pictures, maps, symbols, and graphs to simplify abstract concepts so students can more easily understand the material. (Chandra et al., 2019). A map is a depiction of the earth's surface which is reduced, expressed on a sheet of paper or other media in two-dimensional form. Through a map, it will be easy for us to observe the vast surface of the earth, especially in terms of time and cost. (Saily et al., 2021). The National Coordinating Agency for Surveys and Mapping (now the Geospatial Information Agency) defines a map as a means of storing and presenting environmental condition data, a source of information for planners and decision-makers at stages and levels of development. Seeing the definition of a map, Geography learning will be more interesting for students if the teacher uses map

media. (Maharani & Maryani, 2016). Maps can be presented in various different ways, from conventional printed maps to digital maps that appear on a computer screen. This geospatial data (map) is considered quite effective in conveying the contents of geography lesson materials (Anggriani et al., 2020).

In the learning process that develops spatial literacy for students through both outdoor learning and indoor learning, where spatial thinking skills are applied in this study, the use of indicators in the three aspects of the study is limited to four concepts that are suitable for external research. The first concept, namely place, is a concept related to the ability to connect the location of a place and phenomena on earth. Another concept is distance; in this study, it is assumed that distance is a measure of the relationship between two different objects. The third concept is direction, namely the ability to understand positions that affect room conditions. Fourth, relief is used to estimate the height of the ground surface and the low impact on the activities of living things, especially humans.

The map used as a learning medium in this study is one of the learning components that can support the effectiveness and efficiency of learning activities if the media is used appropriately and optimally. The use of map media can improve students' spatial literacy. Maps allow students to examine past to present conditions so that they can predict future conditions. This has an impact on increasing spatial literacy, which includes students' intelligence in solving problems and making decisions. In understanding spatial intelligence, using maps allows students to analyze all kinds of problems to find solutions to these problems, such as determining the best place to live, the best place to establish various industries, determining direction, distance, proportion, shape, and size, models of earth appearance, possible damage to natural resources, development of transportation and infrastructure (Marzuqi, 2019). In addition to using maps, students can be guided to make maps. According to (Safitri et al., 2021), research shows that cartography skills can improve geographic spatial abilities. Map-making can be given to students.

Based on the data collected from the research results, the researcher's findings are shown from the average results of spatial literacy test scores, spatial thinking skills, and mastery of map use in Class XI students of SMAN 3 Depok, namely spatial literacy average score of 7.83, spatial thinking skills average score of 4.52, and mastery of map use average score of 6.23. From these average scores, spatial literacy is at a high level, spatial thinking skills are still at a low level, and mastery of map use is still at a moderate level.

However, when compared per level, the following questionnaire results were obtained, namely for spatial literacy, did not reach a low level with the highest level of 94.64% and the moderate level of 5.36%. For spatial thinking skills, the most were at a moderate level of 73.81%, a low level of 21.43%, and a high level reaching the least amount of 4.76%. In mastery of map use, the highest level was 45.83%, the moderate level was 47.02%, and the low level was 7.14%. The results of the comparison of test results can be concluded that spatial literacy has the highest value, spatial thinking ability has a medium value, and mastery of map use has the lowest value.

Students who meet the criteria for high spatial thinking ability are 4.22% or only seven students, whereas, of the seven students, only two students have a map use mastery score that falls into the medium criteria. Students who have a score with a high criterion on the map useability test 44.58% or 74 students, but only five students have spatial thinking skills that fall into the high criteria.

## CONCLUSION

Based on the research results that have been obtained, this study concludes that students of SMAN 3 Depok have a high level of ability in spatial literacy and map use, moderate ability in spatial thinking skills, and mastery of map use. High spatial literacy skills can be the basis for developing spatial thinking skills through map media in geography learning. This requires teachers to be able to create interesting learning models to train and explore students' spatial thinking skills through mastery of map use. In the course of the research, it was recognized that there were several weaknesses, namely, research indicators in each aspect of spatial literacy, spatial thinking skills, and mastery of map use; only limited to identification and have not touched on aspects of in-depth analysis-synthesis of the relationship between each indicator, and there were limitations in duration that were not flexible in analyzing research data. Therefore, it is necessary to have sharp research indicators in each aspect of spatial literacy, spatial thinking skills, and mastery of map use, and it is necessary to have in-depth analysis-synthesis related to the interconnectedness of each aspect of map use, spatial literacy, and spatial thinking skills.

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