



## Google Earth Utilization in Increasing Spatial Literacy of High School Students

Hilda Hamdanah<sup>✉1</sup>, Rohmat D<sup>2</sup>, Setiawan I<sup>3</sup>

Jurusan pendidikan geografi sekolah pasca sarjana Universitas pendidikan indonesia

✉ [hildahamdanah25@gmail.com](mailto:hildahamdanah25@gmail.com)

**Abstract.** This research is aim to (1) identify utilization of google earth in increasing spatial literacy of students. Spatial literacy is the ability of student in determine the location, distance, and space. (2) identify the response of students in using google earth to learn geography. Method that used in this research is literature study. The results of this research is the table of google earth utilization in creasing spatial literacy of student which includes the ability to determine the location, distance, and relation between space. As for the table that used was a table that has never been tested because that table was only from literature study of researcher as a recommendation for the future researchers.

**Keyword:** *Google earth, Spasial Literacy, location, distance*

**INTRODUCTION** ~ Geography is a discipline that studies spatial, environmental and regional. Spatial knowledge is the most important part in geography. This is in line with the statement of national geography standards, that "Geography uses multiple forms of visual representations of information with varying levels of complexity. The range of geographic text includes maps, pictures (static or animated), graphs, charts, and geo-spatial representations of information." Geography is a science discipline that use various forms of visual information representation with variety of complexity level. Complementary tools in explaining geography are maps, pictures (static or animation), graphic, and representation of geo-spatial information. This means that geography is a science which studies about space, human ability of space and human ability in utilizing space.

According to the workshop seminar of geography in (Sumaatmadja, 2004) geography is a science that study of

similarities and differences of geosphere phenomenon from environmental or regional perspective in spatial context. Geography studies the space, intelligence and ability of human in utilizing space, where this spatial ability will give the direction of how this nature can be modified for their life sustainability (Maryani, 2015 pg. 3).

In accordance with Regulation of Minister of Education and Culture No. 23 Year 2016 which stated that social attitude competence of high school student is being able to interact effectively in the smallest environment context which is family to the larger environment which is international region. Specifically, in competence of geography of high school level was also explained that high school student has to have: 1) ability in analyze spatial pattern from geosphere elements, 2) ability in analyze the attempts of environmental conservation and sustainability development, 3) ability in analyze the maps, remote sensing imagery



## ICEE-2

and geographic information system in the context of national development, 4) ability in analyze the cooperation between region of domestic or abroad.

As the science that studies the space and spatial analysis or spatial, geography should be the tool which can increase spatial ability of community, especially in the education circle. One component of geography learning that could increase spatial ability of students is reading acitivity and map making.

Reading acitivity and map making in geography is the skills that need to be developed. This is because the skill of map reading is the integrated thing in learning geography, in accordance with that statement, Jarvis C. H. stated that "In educational term, the fact that spatial literasy is so integral to geography in practicular especially when teaching context"[1]. This means spatial geography is the thing which intergrated with learning geography in terms of teaching practice. Reading activity and understanding map is highly related with the understanding of the closest environment of student, environmental understanding of student especially the understanding of spatial aspect can be maximized with the help of media, one of them is by using map [2].

The good teaching and learning activity need actively involvement of students to make learning effective and appropriate with the aims that achieved. An effective learning can be seen from the interest and

attention of students in learning. Interest and attention of student becomes a determinant of effectivity and learning activeness of students. One of the things that can be conducted is create a learning climate which good and attractive for students.

To create a good learning climate, teacher is demand to digging the information that related with the right and attractive learning media and tools. Finding the right and attracted media is definitely accompanied with current technology. This is highly important because the introduction of current technology will give a new spirit for the users, beside using new method, the important thing in learning process is the ability of teacher in mastering the teaching method, according to Faturrahman (in Pramudita, H.) teaching method is indispensable because a teacher cannot teaching well if they was not mastering the method.

Based on the results of initial observation in high school of Cianjur District, it was obtained a representation that students were less attracted in learning which not use media, and they were attracted to the learning that use media. In the continued observation, researcher found that some high school student was experience a difficulty in map reading, and one of it was map of Indonesia. This was seen from some students that experience difficulty and cannot mention some region in the maps that has been provided. Students were less



### ICEE-2

understood the content of map, less to know the location of place in the map. So that the assignment from teacher related with certain area designation was not well conveyed.

Therefore, it needs follow-up related with student understanding and increasing spatial ability of students in learning geography in high school. One of the attempts which can be obtained is by utilizing certain media for learning goals. To learning geography especially in student's understanding and knowledge about maps and spatial ability, can be done by utilizing media of digital map.

In this global era, map reading was not limited only to the image of conventional map and globe, there is also another tools which give new knowledge for the map readers, one of the up to date tool that can be implemented in increasing student's ability to read maps is by using google earth. Google Earth is one tool of map and mapping which gives the spatial information for their users, Google Earth can clearly represent the real image of earth's surface to give the more, new, and real mapping information. Google Earth was also an application in the form of earth's surface image or certain objects with scale, picture, lines, symbols through projection system [3].

Google Earth has considerable potential to enhance methods for teaching geography and helping students develop other capabilities. Google Earth's utility as

a teaching tool in precollegiate environments is illustrated through development of a South Carolina-based lesson plan focused for seventh grade students that increases students' geographic awareness while also building critical thinking, analysis, and inquiry skills in support of various educational standards[4].Google Earth has a big potential to increase teaching method of geography and help students in developing other skills. Skill of Google Earth as teaching tool in education environment was illustrated through development of learning plan for students and the benefits can increase geography awareness of students and also develop critical thinking, analysis, and increase the skill of map reading and has continued impact to increase spatial ability of students to support various educational standards[4].

As a science that has a task in increasing spatial literacy skill of student, geography has the big contribution in giving the way for students to understanding map. Therefore, formulation of the problem of this research are:1) Is utilizing media of Google Earth in learning geography can increase literacy spatial of students? 2) How the response of students toward learning geography after utilizing Google Earth?

From the problem formulation above, the aims of this research is to; 1) identify the increase of spatial literacy of high school students in Cianjur District. 2) obtain the image related with student's response



## ICEE-2

towards learning geography by using media of Google Earth.

### METHOD

Research type that used in this research is quasi-experimental research with the approach of literature study. Subject of this research is high school students of Cianjur District, with the sample that taken randomly, where the research was take the school that utilize Google Earth in their learning of geography. Based on conducted literature study, instrument that used in this research was the test of spatial literacy and questionnaire of student's response. The first instrument that used to identify learning results include pre-test and post test, in the class of experiment and control. While the second instrument is questionnaire that would be given to identify student's response towards learning geography by utilizing media of Google Earth. Collecting and analyzing data in this research is using the help of SPSS version 2.0 program. Test that has been used is t-test and mann whitney test.

### RESULTS AND DISCUSSION

#### a. Spatial Literacy

Literacy is an ability or awareness of somebody in the aspect of reading, listening, and speaking. In other study, literacy was stated as (1) ability to read and write or aware of literacy (2) based on the usage, literacy means an intergrated ability between listening, speaking, reading, writing, and thinking (3) readiness

to be used in mastering new ideas or the way to learn it (4) ability tools to support its success in the environment of academic or social (5) ability of reading and writing performance that always needed; (6) competence of academics in understanding a discourse professionally. In its development nowadays, concept of literacy is related with various human's life so it brought terminology of science literacy, technology literacy, social literacy, political literacy, business literacy, negative attitude literacy, and so on [5].

Literacy ability is an important ability in facing the daily problems. The signs of an individual who has the good literacy ability is being able to understand and read graphic, table, diagram, and interpretate [6]. While the meaning of spatial according to KBBI is something that shows about space or place. Therefore, spatial literacy can be defined as an ability of reading and understanding a space. Spatial literacy is also defined as an ability to input the dimensions of space into the thoughts and problem solving. Someone who has spatial literacy ability will know well the location of them, and how they can solve the problem is they were lost in a place. This is appropriate with statement of Pionik (2009), "Spatial Literacy is the ability to be able to include the Spatial Literacy is the ability to be able to include the spatial dimension in our th spatial dimension in our thinking and problem solving."



### ICEE-2

Then, Pionix (2009) explains the relation of spatial literacy, someone who mastering spatial literacy will having these ability : 1) In determining location, that people will understand the method that determines "where", 2) in relation with distance, someone who has spatial literacy ability will know the importance of relative or absolute positions, 3) Network, understanding the importance of connection, 4) Understanding the environment and region by drawing the conclusions from the context, 5) Overlay, conclude the spatial association, 6) Scale, understanding the scale of maps, 7) Understanding the relation between space.

National Research Council (in Grossner, K and Donald G., Jennele, 2014) stated "that are a useful starting point. To paraphrase: A spatially literate person has (1) good knowledge of fundamental spatial concepts, (2) "spatial ways of thinking and acting"—that is, the "habit of mind" to think spatially and to apply spatial methodologies to solve problems, and (3) proficiency in the use of spatial tools and technologies. From this we derive a concise working definition of spatial literacy for this chapter: an understanding of fundamental spatial concepts and principles and the capability to recognize their appropriate application in answering scientific, engineering, and humanistic questions, aided by spatial technologies." It means that someone who has spatial literacy will have (1) a good knowledge of basic concept of spatial, (2)

"think and act spatially" that are "habit of thoughts" to think spatially and implement spatial method to solve the problems, and (3) skill in using spatial tools and technology. Then we got the short definition of spatial literacy: an understanding of concept and basic principles of space and an ability to recognize the right application in answering scientific questions, technic, and humanistic, supporting by spatial technology. From the above statements, we know that someone who has spatial literacy is they who mastering the maps and related with mapping and also understanding how to utilize the maps in spatial context.

Based on the research results that has been conducted by Maharani W and Maryani. E. in (Jurnal Pendidikan Geografi Vol.15, No.1 April 2015 p.46-54), that using maps will increase spatial literacy of students. Abdurrachman (in Maharani, W and E. Maryani. 2015) in his dissertation was explain the benefits after reading maps for student, that are: 1) maps make the identification of location, distribution, and spatial orientation easier. Those elements are related with direction, distance, and shapes; 2) maps will make easier and clearer of the understanding of concepts which related with direction, distance, location, wide and shape, if it used appropriately in the process of teaching and learning; 3) maps is the tools to express the ideas, among others is someone's perception of environment in the form of spatial construct; 4) maps can



### ICEE-2

fix, change and rich the spatial construct of someone about environment. Seeing the benefits of reading maps, so maps is the media that will increase spatial literacy of students.

The existence of map will be able to increase spatial literacy of students. This was proven with the assesment of pre test and post test that has been conducted by Maharani W and Maryani E in (Jurnal Pendidikan Geografi Vol.15, No.1 April 2015 p.46-54), pre test and post test data that has been collected, was analyzed with the test that has been set and shows that spatial literacy were increased higher in the class that did learning by utilize the media of maps compared with students who was not using media of maps. This means the maps is increase the ability of student's understanding in spatial understanding[7].

Related with map utilization, the use of maps today is not limited only to the image of maps conventially, today maps can be found in more modern side. Maps was usually seen in the form of paper but now we can see it in the form of monitor screen with media of computer or gadget. One of digital maps that gives new color in learning maps and mapping is digital map of Google Earth. Google Earth is one of the newest technology of the image of maps. Maps that usually presented in a flat form and above a piece of paper, right now it presented in digital form. Google Earth is the interactive mapping application from Google.

Google Eath presents the globe, topography condition that can be overlaid with roads, building or other geographic information[8].

According to PT Geo Sriwijaya Group, Google Earth is the application that created by the company of Keyhole Inc in 2004, before it was named Earth Viewer and in 2005 the name was changed. Google Earth is one of imagery record with resolution of up to 15 x 15 m, Google Earth is a free application that can be utilized by every people to see the earth from the air, with Google Earth we can see the location of our house, shape of building, morphology of a region, geographic location, or searching the place by using the feature of search location.

Google Earth is the application that make people easier to get the earth's map through satellite, by the help of Google Earth someone can show the image of earth's surface in the area or certain area that we want, such as the area of settlements, mountain, oceans, and others [9]. So that, Google Earth as one of digital maps will give the information of map and mapping for their user.

Based on national geography standards in the book of National Geography Standard (1994 p.184) stated about several skill that must be owned by students of class 9 – 12. As for the skills is as follows:

1. Student of class 9 – 12 has to have ability of how to use maps and various





**ICEE-2**

geography materials to solve the problems of geography.

2. How to use technology and interpretate the maps toward human's life and environment.
3. How to use geography for the needs of analysis, problem explanation of geography and problem solving of geography.

Based on the above statements, in supporting the increase of ability that has to be mastered by students of class 9 – 12 is to understand the maps and solve the problems through mapping. It was highly related with spatial literacy and can be fulfilled by using digital maps like Google Earth. Because as we have discussed, Google Earth is the application that makes people easir to get the earth's map through our satellites and presents the image of earth's surface in the area or certain area that we want. So the utilization of Google Earth is expected to

makes the student understand of the space or the surrounding places.

According to Bednarz, S and Kerenkemp (2011), "A spatially literate person understands that the form, locations, and relative position of things in the universe contain meaning about the causes and consequences of their structure or arrangement, and should be able to provide examples from more than one field." It means someone who has spatial ability is they who understand that shape, location, and relative position of the things in this universe contains the meaning of causes and consequences of structure or the setting, and being able to give the example of more than one field.

From the statement above, researcher taken the essence as the explanation of Google Earth utilization in increasing the ability of student's spatial literacy. This was based on literature study of researcher, and the table of explanation is as follows:

| No | Skill that must be achieved   |
|----|---|
| 1  | Student's understanding of location <ol style="list-style-type: none"><li>1. Students are able to show several places that has been mentioned by teacher</li><li>2. Students are able to explain the condition around the location</li><li>3. Students are able to show the position of a place from the maps with different periods.</li></ol> |
| 2  | Student's knowledge of shape. Students are able to show the shape of: <ol style="list-style-type: none"><li>1. Road</li><li>2. Railroad</li><li>3. Settlement</li><li>4. Forest</li><li>5. Ricefield</li><li>6. Moor</li></ol>  |
| 3  | Students are able to read components in the digital map that includes: <ol style="list-style-type: none"><li>1. lathering</li></ol>   |



**ICEE-2**

2. grid
3. symbol
4. site
5. hue
6. association
7. pattern

4 Be able to read the scale of maps

5 Be able to calculate the distance of one place with other places based on the provided scale.

The table above was arranged by researcher to complete the needs of researcher in finding the achievement of student's literacy ability. By the explanation through the table, it was expected to measure literacy ability of students by using and utilizing Google Earth.

As for the student's response related with Google Earth utilizing can be answered through the use of this table of the results of student's response, the table was adapted by the research that has been conducted before and researcher add some description that appropriate with the needs of research.

**Table 2.** Student's response related with utilization media of Google Earth

| No | Statement  | Response |   |    |   |    |
|----|--|----------|---|----|---|----|
|    |  | B        | S | SP | P | TP |
| 1  | Learning geography by utilizing media of Google Earth is fun                   |          |   |    |   |    |
| 2  | Learning geography by utilizing media of Google Earth make me more active      |          |   |    |   |    |
| 3  | I can easily determine the distance by using Google Earth                      |          |   |    |   |    |
| 4  | I can easily recognize the location boundaries with the help of wind direction |          |   |    |   |    |
| 5  | I can find the location faster with the help of Google Earth                   |          |   |    |   |    |
| 6  | I can determine the wind direction appropriately                               |          |   |    |   |    |
| 7  | I can find the location faster by using Google Earth                           |          |   |    |   |    |
| 8  | I feel difficult to do the test  |          |   |    |   |    |
| 9  | I am interested to continuously using Google Earth in daily life               |          |   |    |   |    |





---

**ICEE-2**

- 10 I am happy to pay attention to the maps that presented by teacher and be able to explain the meaning of the maps presentation

---

- 11 By using Google Earth and the help of materials from library and the tools of other media such as video, I can explain the occurrence around the location

---

- 12 By using Google Earth By the help of Google Earth, I can describe the surrounding environment condition, about the distance, location and relation of the location with other location

---

- 13 By the help Google Earth, I can easily calculate the real distance of a place

---

- 14 By the help of Google Earth, I can determine the temperature of a place

---

- 15 By the help of Google Earth, I can describe the coordinate points of map, map symbols and the relation between a place with another place

Those two tables was the adapted table and artificial table that has never been test for feasibility product, therefore it needs to be tested first to determine the table that can be used and being a reference for research.

## **CONCLUSION AND SUGGESTION**

### **CONCLUSION**

Inability of students in showing a place is a prove that student was not mastering the space as their place and environment, map reading with the media of internet and other helpful tools such as computer with the application of Google Earth is current technology advances, the use of this new media is the part of technology advances that has to be utilized. Media of Google Earth is expected to make

students increasing their spatial ability such as the increase of student's information related with the location, distance and space and spatial relation. By Google Earth, students get excited in doing their learning activity. Therefore, it has been arranged several questions related with student's response and student's activity in using Google Earth but the measurement in those table has never been tested, the table was arranged through literature study to make researcher and other researcher easier in measuring student's ability in their spatial literacy increase.

### **SUGGESTION**

Measurement table of spatial literacy was the table that rearranged by researcher based on literature study, there is no



**ICEE-2**

product trial yet so it becomes a recommendation for the next researcher.

Swadaya Gunung Jati Cirebon :  
Cirebon.

**REFERENCES**

Dhianira, L sarie, dkk(2016). *Deteksi Banyak Bangunan Rumah Melalui Citra Satelit Google Earth Berbasis Pengolahan Citra Digital*. e-Proceeding of Engineering : Vol.3, No.1 April 2016 | Page 512. [online].available:<https://openlibrar.y.telkomuniversity.ac.id/.../deteksibanyak-bangunan-rumah>

Dwi arta and Andri Pranolo. (2014). *Pemanfaatan Aplikasi Google Earth Sebagai Media Pembelajaran Gografis Menggunakan Metode Image Enhancement*.Jurnal Simposium Nasional RAPI XIII - 2014 FT UMS: Semarang.

Jarvis, C.H. (2011). *Spatial literacy ang the postgraduate GIS curriculum*. procidia social and biahavioral sciences 21(2011) hlm.294-299.[online]. available: <https://www.researchgate.net/publication/251714136>. Di akses:september 2018.

Kusuma, S. Pengembangan Literasi Dalam Kurikulum Pendidikan Dasar Dan Menengah. 2017. Jurnal Pendidikan, Kebahasaan, dan Kesusastraan Indonesia Vol. 1, No. 1, Februari 2017. Universitas

Maharani, W and E.Maryani. (2015). *peningkatan spatial literacy peserta didik melalui pemanfaatan media peta*. Sekolah pasca sarjana Universitas Pendidikan Indonesia: Bandung. *Gea, Jurnal pendidikan geografi* , volume 15 No.1, hlm.46-54.

Maryani, E.2015. *Kecerdasan Ruang Dalam Pembelajaran Geografi*, UPI:Bandung.

National geography. (2012). [online]. *Geography conection*. available:<https://www.nationalgeographic.org/media/common-core-ela-geography-connections/>).

Pamungkas Subhan, A. (2017). *Pengembangan Bahan Ajar Berbasis Literasi pada Materi Bilangan Bagi Mahasiswa Calon Guru Sd*.JPSD Vol. 3 No. 2, September 2017ISSN 2540-9093.[online].available: [https://www.researchgate.net/publication/320279945\\_PENGEMBANGAN\\_BAHAN\\_AJAR\\_BERBASIS\\_LITERASI\\_PADA\\_MATERI\\_BILANGAN\\_BAGI\\_MAHASISWA\\_CALON\\_GURU\\_SD](https://www.researchgate.net/publication/320279945_PENGEMBANGAN_BAHAN_AJAR_BERBASIS_LITERASI_PADA_MATERI_BILANGAN_BAGI_MAHASISWA_CALON_GURU_SD). accessed : 30 November 2018.

Primadita, H.2014. *Peningkatan Wawasan Global Siswa Melalui Penggunaan Media Google Map Dalam Pembelajaran Ips*.Pendidikan ilmu



**ICEE-2**

- pengetahuan sosial FPIPS UPI: Bandung. Sumatmaja, N dkk., 2004. Konsep dasar IPS. Jakarta :Universitas terbuka
- Pionix J. (2009). *The Important Of Spasial Literacy*. [online]. available : [http://gis.rchss.sinica.edu.tw/gishs2009/ppt/Michael\\_Phoenix.pdf](http://gis.rchss.sinica.edu.tw/gishs2009/ppt/Michael_Phoenix.pdf). GIS aducation consultant: Taiwan
- Todd C. Patterson. (2007). Google Earth as a (Not Just) Geography Education Tool. *Journal of geography*. volume 106 Pages 145-152  
[online].available:<https://www.tandfonline.com/doi/abs/10.1080/00221340701678032> . accessed : 23 November 2018 .
- PT. Geosriwijaya nusantara group. (2018). *google earth*. [online].available: <http://geosriwijaya.com/2017/02/fungsi-dan-keunggulan-google-earth>. Accessed at 30 november 2018.