

Factor Analysis: Geographic Literacy Level of High School Students in North Bandung Area

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ABSTRACT

This study aims to (1) Identify the level of geographic literacy of students; (2) Analyze the factors that affect the geographic literacy of high school students in the North Bandung Area. The method used is in the form of survey research with a quantitative approach. The analysis techniques used are descriptive statistics and inferential statistics in the form of simple linear regression. The results obtained show that (1) The level of geographic literacy of high school students in the North Bandung Area is still relatively low; (2) Factors that affect the level of geographic literacy of learners such as gender, use of social media, use of information media and use of spatial information. Therefore, the implications of this research require the role of teachers in promoting the concept of geographic literacy by integrating the concept into learning models, media, teaching materials and assessments in the classroom.

Keywords: Geographic Literacy, Factor Analysis, North Bandung Region

INTRODUCTION

Geographic Literacy according to Edelson (2014) is the ability to use geographical understanding and geographical reasoning to make far-reaching decisions. He mentioned the 3 components of geography literacy, namely: interaction, interconnection and implication. Pattison (1964) in Kerski (2015) defines that Geographic literacy is four already popular assumptions, which are the foundation of geography, namely the study of spatial planning, regions, people-land, and earth

sciences. Furthermore, Maryani (2002) argues that geographic literacy is important for students to have, especially with mastery of five basic concepts, namely location of places, human environmental relations, movements and regions. Nishimoto (2012), Geography literacy includes the decisions we make in solutions to problems we encounter in everyday life.

Yani (2021) argues that there are many types of geoliteration and proposes a variety of basic geoliterations that students need to have including (1) Place and time; (2) Interpretation of maps and imagery; (3) Choosing a place to live; (4) Prediction of social processes; (5) Geoliteration for travel; (6) Understand artifact facts and (7) Beware of the threat of disaster. Usually a person's level of geographic literacy is influenced by several factors including.

1. Gender Factors

The influence of geographic literacy on gender turned out to be a significant influence; men score higher than women (Winship, 2004). The theory of deficiency argues that spatial abilities are related to human physiology and hormonal levels and that differences in physiology and hormones between men and women cause differences in spatial abilities (Kitchin, 1996). Mhishi et al (2013) argue that gender factors influence a person's level of geographic literacy. Some researchers also argue that significant differences are related to sex, with men performing better in terms of geographic

information and spatial skills compared to women (Güven, 2021).

2. Parental Employment Factors

Factors affecting student literacy family circumstances (Ningsih et al., 2019). Pakpahan (2016) mentioned that internal factors that can affect student literacy such as student identity and external factors include family conditions, ownership of learning facilities, and socio-cultural conditions at home. Athtyyah (2020) argues that children's literacy levels can be influenced by parental work factors, due to the availability of children's facilities to continue to be able to explore their knowledge.

3. Travel History Factor

Travel is also found to be an important indicator of geographic literacy (Winship, 2004). Geographic literacy is often needed in everyday life such as planning routes, orienting oneself in unfamiliar environments, and processing destination information (Chang, et al. 2019).

4. Social Media Usage Factors

The study, conducted by Roberts (2003) and Bunin (2001), was designed to explore the relationship between media and geographic knowledge. Both studies concluded that media use is a significant factor in improving geographic knowledge.

5. Factors of Use of Information Media

Watching television is not related to geographical knowledge, but reading about international news in that newspaper (Winship, 2004). Mhishi et al (2013) mentioned that some of the factors found to affect the score were gender, frequency of news media access and the type of news accessed.

6. Factors of Use of Spatial Information

Backler (1986) mentions location knowledge as the first step in achieving geographic literacy. Eve et al. (1994) released that more than 300 students were given a survey that assessed four aspects of geographical knowledge, which included cultural, spatial, and map reading considerations. Sukmayadi & Yahya (2021) mentioned that more technically,

geoliteration can be described as the ability to read maps, have spatial knowledge. Urfan et al (2018) Geo-literacy is strongly related to spatial intelligence, since geographical elements play a role in improving the spatial intelligence of individuals.

7. Foreign Language Usage Factors

Winship (2004) mentioned in his research that students who have multilingualism have a higher level of geographic literacy than students who are minimally multilingual. The National Geographic Education Foundation and Roper ASW (National Geographic) cover a broad population using the number of languages used to determine a person's level of geoliteration.

Based on several descriptions that have been submitted, the objectives of this study are (1) identifying the level of geographic literacy of high school students; (2) Analyze the factors that can affect the geographic literacy of high school students. Meanwhile, the location used as a field observation area is the North Bandung Area (KBU). Why is that? KBU itself is a water catchment area.

Such as the West Java Regional Regulation (Perda) No. 1/2008 concerning Control of Space Utilization in the North Bandung Area (KBU) and the West Java Governor Regulation (Pergub) No. 21/2009 which contains instructions for its implementation. Several previous studies have mentioned land damage in the area (Afandi, 2014; Nurrochman, 2018). Some of these issues require the concept of geoliteration, considering the output of this concept to make a wise decision on the environment including the perception of students in the North Bandung Area, West Java Province.

RESEARCH METHODS

Research Design

The method used is survey research with a quantitative approach. This survey technique was conducted in eight high schools in KBU, West Java Province.

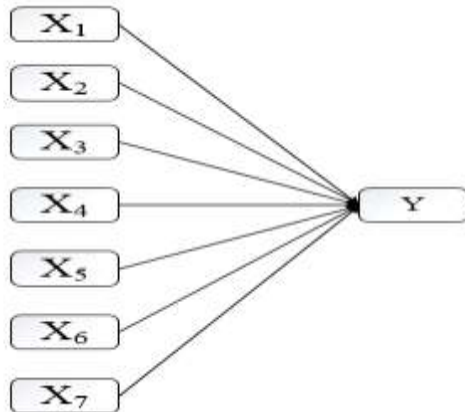
Research Population and Sample

The population in this study was high school students at KBU in class XII. While the sampling technique used is a population

sample, meaning that all class XII students totaling 279 people.

Research Variables

The variables in this study include seven free variables that affect geographic literacy and the bound variable is the level of geographic literacy of students. Illustrated in Figure 1.



Description: gender factor (X₁), parental employment factor (X₂), travel history factor (X₃), social media use factor (X₄), information media use (X₅), spatial information use (X₆) and language use (X₇), Learner Geography Literacy (Y).

Figure 1. Research Variables

Research Instruments

This study is collecting data using tests and questionnaires. The test is used to determine the level of geographic literacy of learners and questionnaires are used to identify factors that affect the geographic literacy of learners. The grids used for research instruments are as follows:

Table 1. Test Instrument Grilles

INDICATORS	ITEM TYPE	ITEM
Interaction	Discourse	1, 4
	Table	7
	Maps	10
	Picture	13, 16
	Graphs	19
Interconnection	Infographics	22, 23
	Discourse	2, 5
	Table	8
	Maps	11
	Picture	14, 17
Implication	Graphs	20
	Infographics	24
	Discourse	3, 6
	Table	9
	Maps	12
	Picture	15, 18
	Graphs	21
	Infographics	25

Table 2. Questionnaire Instrument Grid

INDICATORS	SUB INDICATORS	ITEM
Gender	Man	1
	Woman	
Travel History	Travel Frequency	2, 3, 4, 5
	Out of Town/Regency	
	Out of Province	
	Abroad	
Parents' Work	Civil Servant/Police/Soldier	6
	Wiraswata	
	Private Employees	
	Freelance Day Laborer	
	And others	
Use of Social Media	Youtube	7, 8, 9, 10, 11
	Youtube Content	
	Facebook	
	Instagram	
	Twitter	
Use of Information Media	Read the news	12, 13, 14
	Watching TV	
	Reading Electronic Newspapers	
Use of Spatial Technology	Google maps	15, 16, 17, 18
	Map	
	Atlas	
	Globe	
Mastery of Foreign Languages	Language Usage	19, 20, 21, 22
	The Importance of Language Usage	
	English Language Skills	
	Regional Language Skills	

Meanwhile, the results of the validity and reliability test of the instrument using the help of the SPSS 22 application are presented in Table 3.

Table 3. Test Instrument Validity Test Results

Item	Decision	Item	Decision
1	0,436	14	0,289
2	0,328	15	0,284
3	0,313	16	0,260
4	0,336	17	0,336
5	0,307	18	0,275
6	0,351	19	0,298
7	0,019	20	0,360
8	0,370	21	0,339
9	0,320	22	0,295
10	0,350	23	0,375
11	0,666	24	0,019
12	0,332	25	0,411
13	0,269		

Description: r table known 0.267 out of a sample of 39 inhabitants.

Based on the results of processing validity data for the geographic literacy test, there are 22 valid questions and 3 invalid questions. This validity is still used with the process of revising word diction with experts so that the entire question item is used to determine the level of geographic literacy of students. Meanwhile, the reliability results of the instruments have been presented in Table 4.

Table 4. Test Reliability Test Instruments

Reliability Statistics	
Cronbach's Alpha	N of Items
,624	25

Source: Data Processing Results (2022)

The above reliability results, show the numbers in the high category, so the instrument is worth using.

Data Analysis Techniques

The analysis technique used is in the form of descriptive statistics in the form of percentages in presenting data on the level of geographic literacy of students with high, medium and low (limited) criteria. Meanwhile, inferential statistics of multiple linear regression in presenting the results of factor analysis that affect the level of geographic literacy with the criteria used, namely:

1. If the significant value of $t > 0.05$ then there is no significant effect of the free variable on the bound variable. This means that H_0 is accepted and rejects H_a .
2. If significant $t < 0.05$ then there is a significant influence between the free variable against the bound variable. This means that H_0 is rejected and accepts H_a .

RESULTS AND DISCUSSION

1. Geographic Literacy Level of High School Students in North Bandung Area

Geographic Literacy is a trend of terms that is currently an attraction in itself to be studied more deeply. Geographic Literacy is a person's ability to be wise in making a decision. There are three indicators of Geographic Literacy including indicators of interaction, interconnection and implications (Edelson, 2013). In this study, the level of geoliteration was identified in the subjects of high school students for the North Bandung area. The identification has been presented in Figure 2.

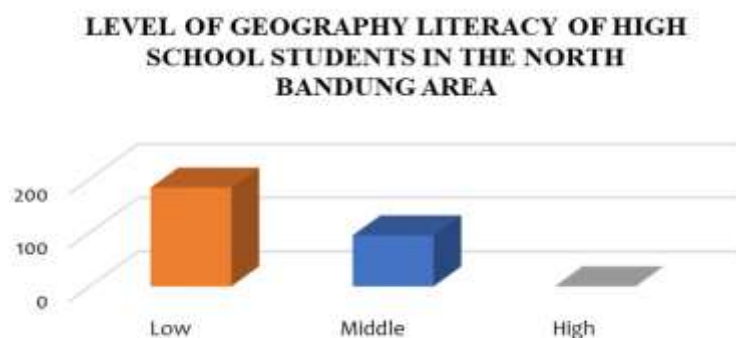


Figure 2. Literacy Level of Geography of Students at KBU
Source: Field Observations (2022)

The Geography Literacy Ability of students from eight schools surveyed for the North Bandung area can be concluded that their abilities are still low as many as 184 people (65.95%) need a geography literacy stimulus in the teaching and learning process in the classroom. These limitations can be pursued by providing a stimulus that integrates geoliteration in the teaching and learning process in the classroom.

Hasanah & Ruhimat, (2019) mentioned that geographic literacy is not only about memorizing the names of locations, rivers, mountains and seas, but also is a human ability that is critical of the conditions of the surrounding environment. Continued, Sack and Peterson (1998) in Güven (2021) think that teachers play an important role in raising students with geo-literacy. Continued, the importance of geoliteration in terms of protecting the natural environment, which is very important for human life, cannot be overstated.

Schell et al. (2013) add that this concept of geoliteration is essential for making a

sensible decision through geographical considerations. Considering, the geographical location of Indonesia which is on three large plates, namely Eurasia, Indo-Australia and the Pacific and a small-scale plate, namely Fliphina in the north of Indonesia, which has a negative impact in the form of frequent disasters such as tsunamis, earthquakes, landslides, floods, volcanic eruptions and others.

2. Factors Affecting the Geographic Literacy of High School Students in the North Bandung Area

The results of data processing from seven independent variables include gender factors (X_1), parental work factors (X_2), travel history factors (X_3), social media use factors (X_4), information media use (X_5), spatial information use (X_6) and language use (X_7). The following are the results of data processing using the SPSS Statistical 22 application which is presented in Table 5.

Table 5. Variable Partial T-test Results

Coefficients ^a		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model		B	Std. Error	Beta		
1	(Constant)	28,407	6,783		4,188	,000
	Gender	-,587	1,418	-,026	2,414	,002
	Parents' Work	-,693	,478	-,089	-1,448	,149
	Travel History	-,354	,336	-,067	-1,054	,293
	Use of Social Media	,516	,263	,126	1,974	,000
	Use of Information Media	-,143	,460	-,020	2,310	,000
	Use of Spatial Technology	-,249	,390	-,043	2,639	,002
	Mastery of Foreign Languages	,237	,546	,028	,433	,665

a. Dependent Variable: Geoliterasi Student's

Source: Data Processing Results (2022)

Based on Table 5 showing some facts that support and reject previous research, here is the explanation:

The first fact, the gender factor (X_1) confirms that the level of geographic literacy of men is greater than that of women. This is shown in the mean values of 29.67 (Male) > 29.49 (Female). In general, this gender factor is one of the factors that can affect geographic literacy based on the results of inferential statistical tests that show the value of Sig = 0.00 is greater than

the probability value of 0.05 or the value of $0.05 > 0.02$, then H_0 is rejected and H_a is accepted meaning that the regression coefficient is significant while the calculated value is $> t_{table}$ ($0.2414 > 1,968$) based on this statistical test, it can be concluded that the gender factor (X_1) has a significant effect on the geographic literacy of high school students in the North Bandung area.

This fact supports several previous studies such as Winship (2004) revealed that men's geographic literacy rates are higher than

women's. Far from that year, Kitchin (1996) also released that women's spatial thinking is lower than that of men whose knowledge is related to the concept of geographic literacy. It is feared that the fact that weak geographic literacy in women can affect women's wisdom in making decisions in everyday life. Mhishi et al (2013) revealed that of the 103 Zimbabwean students studied, women's geoliteration was lower than that of men.

Some researchers also mention the same thing regarding Some researchers also argue that significant differences are related to sex, with men performing better in terms of geographic information and spatial skills compared to women (Bein, 1990; Cross, 1987; Chiodo, 1993; Eve et al., 1994; Gençtürk, 2009; Hardwick et al., 2000; NAEP, 1994; National Geographic Roper Survey, 2002; Roper National Geographic Survey, 2006; Nolan, 2002; Oigara, 2006; Thomas, 2001; Torrens, 2001; Wood et al., 1988; Winship, 2004; Güven, 2021).

The second fact, the parental employment factor (X_2) confirms that the level of geographic literacy of students whose parents' work is in the form of private employees has a value ($\bar{x}=32.93$) higher in geographic literacy ability compared to other types of work, followed by self-employed ($\bar{x}=30.73$) and civil servants/police/tni ($\bar{x}=29.73$). This condition is a factor that can affect the level of geographic literacy of students, although it is not yet a final decision descriptively inferential. Inferential statistics show that the probability value of Sig = 0.149 is less than the probability value of 0.05 or the value of $0.05 > 0.149$, then H_0 is accepted and H_a is rejected meaning that the regression coefficient is insignificant.

This fact rejects the outline that a parent's work history can affect a person's literacy, as the results of research by Ningsih, et al (2019) revealed that one of the factors that influence literacy is parental work. Continued research from Pakpahan (2016) in his research stated that factors of family

conditions, ownership of learning facilities, and socio-cultural conditions at home can affect children's literacy. This fact is also contrary to the results of previous research from Athyyah (2020) which states that parental work factors can provide complete facilities to explore their children's knowledge.

The third fact, the travel history factor (X_3) confirms that the more learners have travel history, it can affect their geographic literacy. Descriptively, 174 (62.37%) were categorized as having limited travel history, this is when confirmed by the geographic literacy of 184 (65.95%) students categorized as limited as well. However, statistically inferential data shows that the probability value of Sig = 0.293 is less than the probability value of 0.05 or the value of $0.05 > 0.293$, then H_a is rejected and H_0 is accepted meaning that the regression coefficient is insignificant.

Looking at the results of this research, it is not in line with some previous research such as Winship (2004) states that a person's travel history can affect their geographic literacy. Chang et al (2019) stated that this travel history will affect geograf literacy if those who plan travel routes, orient themselves in an unfamiliar environment and process destination information independently such as foreign tourists or foreign tourists who are visiting.

The fourth fact, the social media usage factor (X_4) confirms that the more often learners use social media, the better the level of geographic literacy. Descriptively 279 learners were categorized as high usage around (6.09%) or 17 people. Meanwhile, the dominance of the highest level in the medium category was 147 people (52.69%) and the low category was 115 people (41.22%). In addition, the value of Sig = 0.00 is less than the probability value of 0.05 or the value of $0.05 > 0.00$, then H_0 is rejected and H_a is accepted meaning that the regression coefficient is significant. This fact is supported by several previous studies

such as Roberts (2003) and Bunin (2001) exploring media and geographical knowledge can significantly improve their geographical knowledge.

The fifth fact, the factor of using information media (X_5) confirms that learners who often use information media such as television and electronic news have a descriptive influence based on the value of the mean \bar{x} geographic literacy of learners. Evidenced from 279 learners mostly categorized as low (54.48%). As for the medium category (41.94%) and the high category (3.58%). Inferentially obtained the value of Sig = 0.00 is less than the probability value of 0.05 or the value of $0.05 > 0.00$, then H_0 is rejected and H_a is accepted meaning that the coefficient of regression is significant. Mhishi et al (2013) mentioned that some of the factors found to affect the score were gender, frequency of news media access and the type of news accessed. Mhishi et al (2013) released research results in addition to gender, frequency of access to news media and the type of news accessed can also increase a person's geographic literacy.

The sixth fact, the factor of using spatial information (X_6) confirms that learners who often use spatial media can affect their geographic literacy. Descriptively, 75.27% or 210 of the 279 learners can be categorized as low in the use of spatial information media. Whereas statistically inferential shows the value of Sig = 0.02 is less than the probability value of 0.05 or the value of $0.05 > 0.02$, then H_0 is rejected and H_a is accepted meaning that the regression coefficient is significant.

Supporting the results of this research, Backler (1986) said that location knowledge is the first step in achieving a person's geographic literacy. Eve et al (1994) based on the results of research obtained by more than 300 students surveyed on geographic literacy have a correlation with a person's spatial reading of maps. Sukmayadi & Yahya (2021) also mentioned that

technically geoliteration is the ability to read maps and the spatial knowledge they have. Supporting this, Urfan et al (2018) mention that geoliteration is strongly related to spatial intelligence.

The seventh fact, the language generation factor (X_7) confirms that this factor the more learners have skills in mastering the language, there is a higher probability of geographic literacy. This can be inferred from 279 people as many as 73% or 203 people in the medium category and 22% (62 people) in the low category, the rest are in the high category. However, this has no visible effect on inferential statistics, the gain of the value of Sig = 0.665 is less than the probability value of 0.05 or the value of $0.05 > 0.665$, then H_a is rejected and H_0 is accepted meaning that the coefficient of regression is insignificant.

The results of this study also refute previous studies such as Winship (2004) if students who have multilingualism, also have a high level of geographic literacy as well. Continued the National Geographic Education Foundation and Roper ASW (National Geographic) (2002), explaining that to find out the geoliteration of a person can use a number of languages to determine it. Some of these facts were obtained from high school students for the North Bandung area which is an environmental conservation. In addition to the fact about what factors affect the geographic literacy of students.

CONCLUSION

The level of geographic literacy is indicators of interaction, interconnection and implications of students is still relatively limited. This is evidenced by the acquisition of field data which shows that 65.95% or as many as 184 of the 279 students need to be trained to get stimulus during the teaching and learning process in the classroom. This limitation is a promotional event to improve the geographic literacy of students at KBU such as learning and assessment activities.

The limited level of geographic literacy of students is influenced by several factors such as gender factors (X_1), social media use factors (X_4), use of information media (X_5) and the use of spatial information (X_6) on the geographic literacy of students in the North Bandung Area. Meanwhile, other minor variables do not show the significance value of their influence such as the variables of parental employment factor (X_2), travel history factor (X_3), language use (X_7).

The field results obtained also show that the factor of using spatial media is the factor that has the highest value compared to other factors in influencing the level of geographic literacy of students, so it is hoped that the stimulus can be collaborated on geographic literacy based on the use of spatial media such as maps, globes, google maps, applications that lead to children's spatial and can also be implemented using learning models, geoliteracy-based assessments, learning media, teaching materials and others.

Declaration by Authors

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