

Relationship Professional Competence of Geography Teachers with Spatial Thinking Students in Pandeglang District High School

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Abstract

This study aims to determine the relationship of the professional competence of geography teachers with the ability of spatial thinking students in Pandeglang District High School. This study uses a survey method where this method is a method that aims to collect large amounts of data in the form of variables, units or individuals at the same time. Research using this method is intended to obtain a detailed picture of the Relationship of Professional Competence of Geography Teachers with Spatial Thinking of students in Pandeglang District High School. The subjects in this study were students of class XII IPS in several schools in Pandeglang District High School. The instrument used was a Likert scale to determine the professional competence of geography teachers according to students 'perceptions and multiple-choice questions for abilities spatial thinking students'. Based on the results of data analysis, it was concluded that: (1) the average percentage of professional competencies of geography teachers according to students' perceptions was 88.23% with very high criteria; (2) the average percentage of abilities spatial thinking students' is 81.87% with very high criteria; (3) there is a positive relationship between the professional competence of geography teachers and the ability of spatial thinking students with a significance value of 0,000 and the value Pearson correlation of 0.973 at a very strong degree of relationship.

INTRODUCTION

Education is one of the important sectors in development in each country. With quality education, a person can improve his standard of living by utilizing the knowledge gained in his education into daily life. Education according to Jamali (2013) is a human investment long-term, the results of which may not be felt immediately, but only felt in the future.

Based on Law No. 20 of 2003 education is a conscious and planned effort to create an atmosphere of learning and learning process so that students actively develop their potential to have spiritual strength, self-control, personality, intelligence, noble character, and the skills needed by themselves, society, nation, and country. Therefore a good education is an education that can deliver students to have the skills needed by themselves, the community, the nation, and the country. But all that can not be separated from the role of a teacher, according to Mukminan (2014) teachers including Geography teachers, as the forefront in developing and implementing geography learning must understand the position of Geography itself. Furthermore, teachers have the responsibility and obligation to make fundamental efforts in various forms of learning innovation so that the implementation of the learning process can achieve the specified competencies, while also helping to bring the children of this nation into a dignified nation in the eyes of their nation and internationally.

The aim of teaching geography will be achieved if a geography teacher is able to implement the professional competence of the teacher well. Based on the Minister of National Education Regulation Number 16 the Year 2007 Regarding Academic Qualification Standards and Teacher Competencies The Professional Competency Standards include the following indicators: a) Mastering the material, structure, concepts and scientific mindset that supports the subjects being taught; b) Mastering competency standards and basic competencies of the subjects being taught; c) Develop subject learning material creatively; d) Develop professionalism in a sustainable manner by taking reflective action; e) Utilizing information communication technology to develop themselves. Meanwhile, according to Anggela (2015), professional competence is related to the field of study which consists of Sub-Competencies: a) Understanding the subjects that have been prepared for teaching; b) Understand the competency standards and subject matter standards listed in the Ministerial Regulation as well as teaching materials in the one education curriculum (KTSP); c) Understanding the structure, concepts, and scientific methods that shelter teaching material; d) Understanding the conceptual relationships between related subjects and e) Apply scientific concepts in everyday life.

The learning process of geography is an event that is directed towards the achievement of the objectives of teaching geography, where the aim of teaching geography is to understand the phenomena of the natural environment and life on earth, the characteristics of regional units, and the problems faced as a result of mutual influence between humans and their environment (Sumaatmadja: 1997). Meanwhile, according to Oktavianto (2017), one of the objectives of learning geography is to provide students with the ability to think spatially. One of the struggles central to teaching and learning of geography is helping students learn to think spatially (Webster: 2015).

According to JA Sporck and O. Tulippe in Yani (2016) said that the role of geography is by saying that «the study of spatial relations geography as the study of spatial relations of phenomena». In studying spatial relations, often geographers explore various factors that influence the emergence of certain circumstances and events. For that, carefulness is needed in finding the causative factors, identifying and looking for relationships of these factors so that they affect the emergence of a situation or event. In identifying the causative factors, experts will pay attention to many factors including natural, social, economic, cultural, and other factors. Relationships between factors that influence are identified, both in the cause and effect relationship and the grouping and mapping of problems. Natural factors affect social factors, or conversely, social factors affect natural factors. Thus to understand a situation or event on the surface of the earth, it requires a comprehensive insight and looking for relations between rational factors, one of them is spatial thinking.

According to the National Research Council (2006) defines spatial thinking as a constructive mix that includes three elements: the concept of space, a tool of representation and the process of reasoning. Spatial thinking as knowledge, skills and habits of mind to use the concepts of space (such as distance, direction, distribution, and association), representation tools (such as maps, graphs, and diagrams), and reasoning processes (such as cognitive strategies to facilitate solving problem and decision making) for a structured problem, looking for answers, as well as quick solutions to the problem. Therefore spatial thinking can work well when it has visualized the concept of space, the tools of representation, and the process of reasoning. Meanwhile, according to the Association of American Geographers (2006), there are 8 components of spatial thinking that must be possessed by someone, including Comparison (spatial conditions and connections), the ability to compare how places have similarities and differences; Aura, (spatial aura is a zone of influence of an object to its surroundings) the ability to show the effect of the uniqueness of an area on adjacent areas; Region,

the ability to identify places that have similarities and classify them as a single unit; Hirarkhi, the ability to indicate places that are in accordance with the hierarchy in a set of areas; Transition, the ability to analyze changes in places whether they occur suddenly, gradually, or irregularly; Analogy, the ability to analyze whether the places are far apart but have the same location and therefore may have the same conditions and or connections; and Association (correlation), the ability to read a pair of symptoms that tend to occur together in the same location (which has the same spatial pattern). Referring to the description above, researchers are interested in conducting survey research to find out the relationship between the professional competencies of geography teachers and the ability of spatial thinking of students in Pandeglang District High School. The formulation of the problem in this study is as follows.

1. How is the Professional Competence of Geography Teachers according to students' perceptions at the Pandeglang District High School Regency?
2. What is the ability of spatial thinking students in Pandeglang District High School?
3. Is there a relationship between the professional competence of geography teachers and the abilities of spatial thinking students in Pandeglang District High School?

RESEARCH METHODOLOGY

This research uses survey research methods which according to Tika (2005) survey is a method that aims to collect large amounts of data in the form of variables, units or individuals at the same time. Research using this method is intended to get a detailed picture of the Relationship of Professional Competence of Geography Teachers with Spatial Thinking of students in Pandeglang District High School. The research subjects were students of class XII-IPS who were in several state high schools in the Pandeglang Regency with a total of 97 people. The sample selection technique used in this study was purposive sampling. According to Siyoto (2015), the sampling technique with technique purposive sampling is based on certain considerations or special selection made by the researchers themselves by looking at characteristics or characteristics of the population that have been known previously. The sampling technique in this study is based on consideration of the results of the 2019 National Examination, so that the top 3 schools that have the highest National Exam scores in Geography in Pandeglang District High School. A list of National Examination Results for Pandeglang Regency High School can be seen in Table 1.

Table 1. List of National Examination Results for Pandeglang Regency Public High School

No.	School Code School	Name	Sts Sek.	Tests	Highest Grade
1	06-0001	State High School 1 Pandeglang	N	Geography	80.00
2	06-0003	State High School 6 Pandeglang	N	Geography	68.60
3	06-0075	State High School Light Madani Banten Boarding School	N	Geography	94.00

Teacher professional competency according to students' perceptions is an assessment conducted by students to teachers based on indicators provided to students by researchers in the form of statements, with indicators based on Minister of National Education Regulation No. 16

of 2007 concerning Academic Qualification Standards and Teacher Competence The Professional Competency Standards include the following indicators: a) mastering scientific material and concepts that support learning, b) developing subject learning materials creatively, c) utilizing communication information technology to develop themselves, d) applying scientific concepts in daily life. The instrument used to measure the professional competence of geography teachers according to students' perceptions in the form of Likert scale statements was 34 statements representing four aspects of teacher professional competence. The scoring of professional competence is the highest answer given a score of 5, and the lowest answer is given a score of 1 as presented in Table 2.

Table 2. Scoring Questionnaire Professional Competencies Based on Students' Perceptions

Answers	Statements	
	Positive	Negative
Always	5	1
Often	4	2
Sometimes	3	3
Rarely	2	4
Never	1	5

Table 3. Interval Criteria for Teacher Professional Competency Based on Student Perceptions

Number of scores	Attitude Classification
13.853 – 16.490	Very High
11.215 – 13.852	High
8.577- 11.214	Sufficient
5.939 – 8.576	Low
3.298 – 5.938	Very Low

The ability of spatial thinking students' is the ability of students to understand space. The ability of spatial thinking can be seen based on the ability of students to answer the questions given by researchers to students at the time the research takes place. These aspects of spatial thinking students can be seen based on a) Comparison (spatial conditions and connections), the ability to compare how places have similarities and differences b) Aura, (spatial aura is a zone of influence of an object to its surroundings) the ability to show the effects of the uniqueness of an area with respect to adjacent areas c) Hirarkhi, the ability to show places that are in accordance with the hierarchy in a collection of areas d) Association (correlation), the ability to read a pair of symptoms that tend to occur together in the same location (which has the same spatial pattern) and e) Region, the ability to identify places that have similarities and classify them as one entity. (Association of American Geographers, 2006). The test instrument used to measure abilities spatial thinking students' in the form of multiple-choice questions was 25 questions representing five aspects of abilities spatial thinking. test scores Spatial thinking namely correct answers were given a score of 1, and incorrect answers were given a score of 0 as presented in Table 4.

Table 4. Instrument Answer Problem

Instrument	Question	
	True	False
Ability Spatial Thinking	1	0

Categories percentage spatial thinking of students can be seen in Table 5.

Table 5. Descriptive Analysis Criteria Percentage

No.	Percentage of	Criteria
1	81% -100%	Very High
2	61% -80%	High
3	41% -60%	Sufficient
4	21% -40%	Low
5	≤20%	Very Low

The hypotheses in this study are:

H_0 : there is no relationship significant professional competence of geography teachers and spatial thinking students’.

H_1 : There is a significant relationship between the professional competence of teachers of geography and the spatial thinking of students.

Hypothesis testing uses the Pearson Correlation test in the SPSS program with the test criteria: if the probability value (Sig.) $\geq \alpha$ ($\alpha = 0.05$), then H_0 is rejected, if the probability value (Sig.) $\leq \alpha$ ($\alpha = 0.05$), then H_1 is accepted. Furthermore, the coefficient value to determine the relationship level (Pearson Correlation) can be interpreted in Table 6.

Table 6. Relationship Levels Based on Pearson

Coefficient Interval	Relationship Levels
0,80-1,000	Very Strong
0,60-0,799	Strong
0,40-0,599	Fair
0,20-0,399	Low
0,00-0,199	Very Low

RESULTS AND DISCUSSION OF

Teacher Professional Competency Results based on Student Perceptions in Pandeglang District High School Regency

The professional competency instruments of geography teachers according to students’ perceptions are given to 97 students in Pandeglang District High School. The following data on the percentage of professional competence of geography teachers according to students’ perceptions in Pandeglang District High School is presented in Table 7.

Table 7. Data Analysis Percentage Average Teacher Professional Competence Geography According to State High School Student Perceptions in Pandeglang District

School	Number of Students	Percentage of Average (%)	Criteria for
State High School 1 Pandeglang	34	88.08	Very High
State High School 6 Pandeglang	34	88.06	Very High
State High School Light Madani Banten Boarding School	29	88.56	Very High
Average		88.23	Very High

The results of the descriptive analysis in Table 7 show that the average percentage of professional competence of geography teachers according to students' perceptions at Cahaya Madani Boarding School is 88.56% higher than SMA Negeri 1 Pandeglang Regency which is 88.08% and SMA Negeri 6 Pandeglang Regency that is 88.06%. It can be concluded that students in Pandeglang District High School have an average percentage of professional competencies of geography teachers according to students' perceptions of 88.23% with very high categories.

Furthermore, the questionnaire response criteria of all respondents are presented in Table 8 and Figure 1 below.

Table 8. Interval Criteria for Professional Competence of Teachers Based on Students' Perceptions

Total Score of	Classification of Competencies
13,853 - 16,490	Very High
11,215 - 13,852	High
8,577 - 11,214	Sufficient
5,939 - 8,576	Low
3,298 - 5,938	Very Low

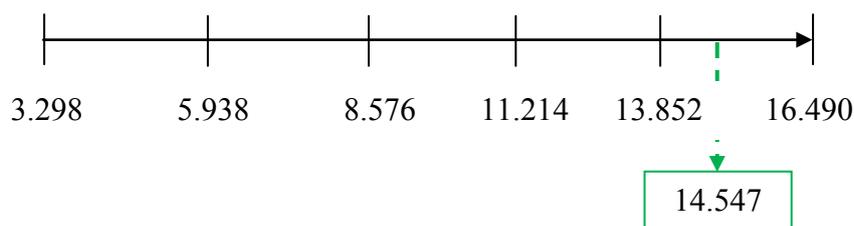


Figure 1. Classification of the Number of scores Professional Teacher Competency Based on Student Perceptions

Based on Table 8 and Figure 1 above, obtained a score of 14,547 at intervals of 13,853 - 16,490 with very high criteria. Thus, it can be concluded that the criteria for the Professional Competence of Geography Teachers in Pandeglang District High School can be categorized very high.

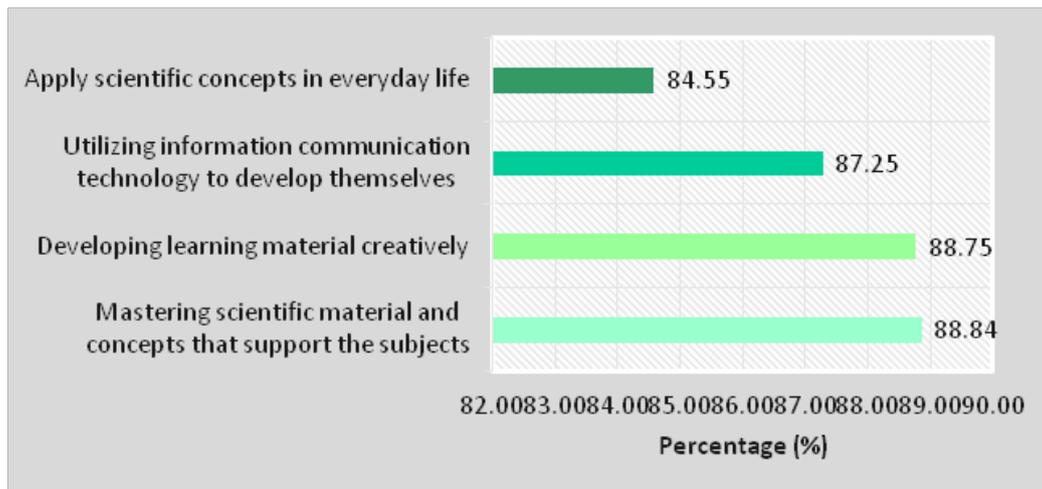


Figure 2. Percentage of Professional Competence Geography Teachers by Student Perceptions in State High School Pandeglang

Based on Figure 2, the average percentage score of professional teacher competencies based on students' perceptions in Pandeglang District High School had higher scores on indicators of mastering material and scientific concepts that support learning that is equal to 88.84% compared to other indicators. While the indicators applying scientific concepts in daily life have a lower percentage score compared to other indicators that are 84.55%. This is influenced by the mastery of the material, structure, concepts, and scientific mindset of the teacher that supports the subjects being taught. In line with this, according to Ali (2015) mastery of the material for teachers is very crucial, especially in the teaching and learning process involving subject teachers. A teacher must understand the types of learning material. Some things teachers must have are the ability to describe standard material in the curriculum.

In this indicator, most students assess that the teacher is able to determine precisely the relevant material in accordance with the needs and abilities of students, the subject matter delivered reaches the learning objectives, and the allocation needed to deliver the material as a whole when learning takes place can be completed when learning has ended. In this indicator, the student's assessment of the mastery of the material, structure, concepts, and scientific mindset of the teacher that supports the subject is able to get an average percentage score higher than other indicators with a percentage of 88.84% on the very high criteria.

The second indicator applies a variety of approaches, strategies, methods, and learning techniques that educate creatively to be interesting and in accordance with the level of development of students in subjects that are able to be used as a benchmark to find the development of out the creative subject learning materials conducted by teachers. In line with this according to Suryadi (2015) In order to create creative, professional and fun learning, a teacher is required to have teaching skills, such teaching skills are questioning skills, giving reinforcement, variations, explaining, opening and closing lessons, guiding group discussions small, manage classes and teach small groups and individuals. In this indicator, students assess that the teacher is able to develop learning material creatively and fun when learning takes place, choose learning material according to the level of development of students, understand various learning theories and learning principles, and the teacher is able to apply various approaches, strategies, methods, and learning techniques when learning takes place with an average percentage of 88.75 with very high criteria.

The third indicator is mastering and can utilize information and communication technology in communicating both with students and the surrounding environment, facilities and media within the school environment, utilizing information and communication technology for professional development as a benchmark for knowing the ability of teachers in utilizing information technology communication to develop themselves in school. In this indicator, the teacher can utilize communication information technology, provide insight and follow developments in information and communication technology and the teacher has extensive knowledge and ability to follow the development of information and communication technology. In this indicator teacher communication information technology based on the assessment of students' perceptions gets a percentage of 87.25% with a very high category.

As well as the fourth indicator the teacher explores through assignments to carry out activities outside the classroom, linking curriculum or learning material with everyday problems in the community, and applying learning material into daily life is used as a benchmark for knowing the application of concepts knowledge in everyday life that is carried out by the teacher when the learning takes place at school. In line with this according to Sudjana (2005), learning is the abilities possessed by students after he receives a learning experience. Thus, to achieve learning success there needs to support from teachers and schools in presenting learning that is interesting and attractive to students. In this indicator applying learning material into daily life based on the assessment of students' perceptions gets a percentage of 84.55% with a very high category.

The ability of Spatial Thinking Students in Pandeglang District High School

The instrument spatial thinking developed was given to 97 students in Pandeglang District High School. The following data on the percentage of spatial thinking is students' presented in Table 9.

Table 9. Results of Data Analysis of the Average Percentage of Ability of Spatial Thinking Students

School	Number of Students	Percentage Average(%)
State High School 1 Pandeglang	34	81.65
State High School 6 Pandeglang	34	81.76
State High School Light Madani Banten Boarding School	29	82.21
Average		81.87

Descriptive analysis results in Table 9 show that the average percentage of high school students Cahaya Madani Boarding School which is 82.21% higher than SMAN 1 Pandeglang is 81.76% and SMA 6 Pandeglang which is 81.65%. It can be concluded that students in Pandeglang District High School have an average percentage of abilities spatial thinking students' of 81.87% with a very high category.

Following the average percentage of spatial thinking of students in SMA Negeri 1 Pandeglang, SMA Negeri 6 Pandeglang, and SMA Cahaya Madani Boarding School are presented in Figure 3.

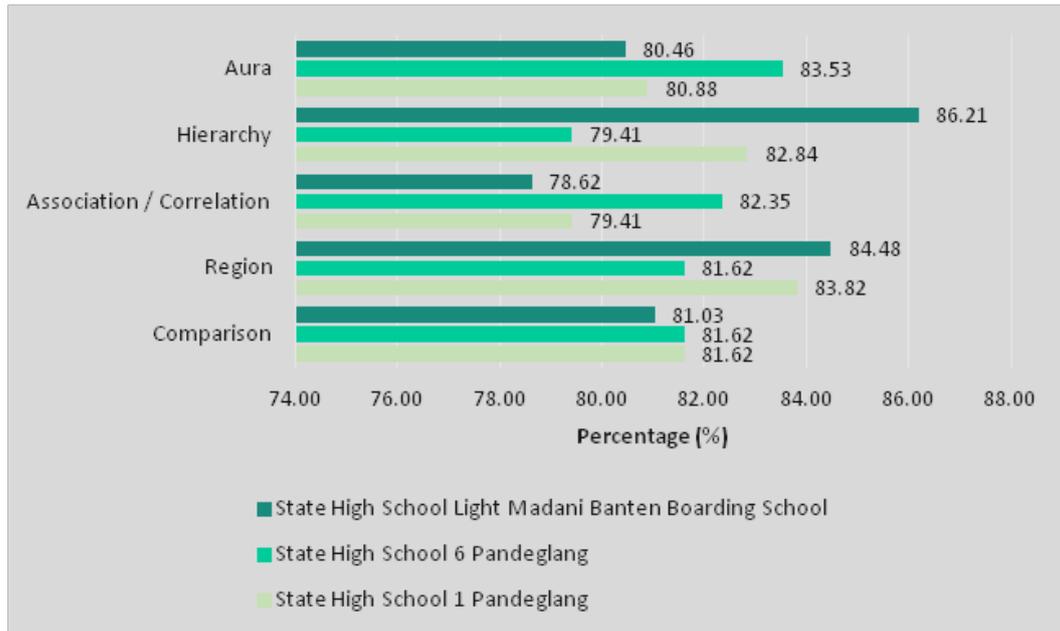


Figure 3. Average Percentage of Spatial Thinking Students at State High School 1 Pandeglang, State High School 6 Pandeglang, and State High School Light Madani Banten Boarding School

Based on Figure 3, when viewed in each indicator and school, students in Cahaya Madani Boarding School have the highest percentage of spatial thinking on the hierarchical indicator, at 86.21% with criteria very high. But high school students Cahaya Madani Boarding School also has a percentage of average spatial thinking of the lowest on the indicator association/ correlation, amounting to 76.91% with the high criteria.

The following is the percentage of abilities spatial thinking students' in the Pandeglang District High School presented in Figure 4.

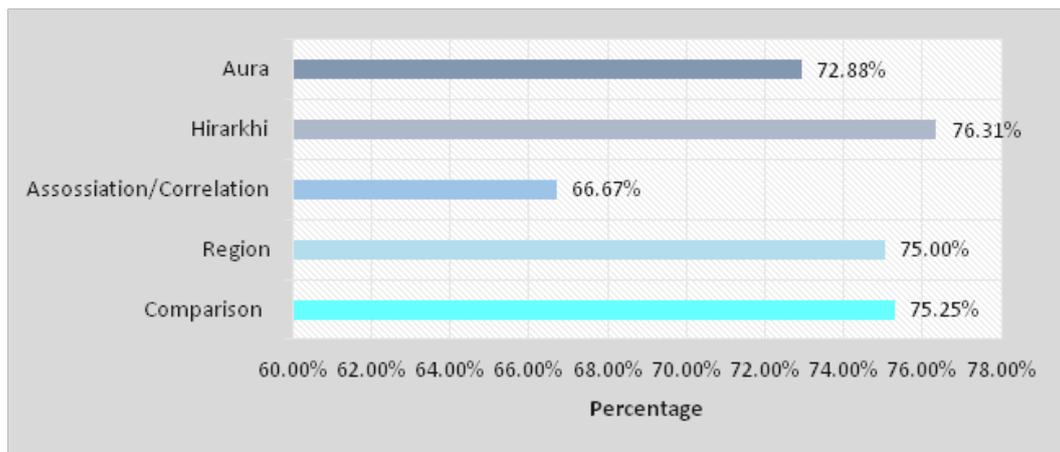


Figure 4. Percentage of the ability of Spatial Thinking Students in Pandeglang District High School

Based on Figure 4, the average percentage score of abilities of spatial thinking students in Pandeglang District High School had a higher score on the hierarchical indicator of 76.31%

compared to other indicators. While the indicator association/ correlation has a lower score than the other indicators, namely 66.67%.

The first indicator is comparison with an average percentage of 75.25% on high criteria. On this indicator, most students have succeeded in comparing places that have similarities and differences (Comparison). Just as students can find out the differences between school and hotel buildings through the interpretation of aerial photographs by using elements of shapes and patterns, besides that students can distinguish social and phenomena natural phenomena. Through indicator comparison, students get new information about new and unfamiliar places. Gersmehl in Oktavianto (2017) revealed that learning about comparisons between places will provide students with knowledge about how places and regions change and connect.

In the second indicator, students can identify places that have similarities and classify them as a (region) with an average percentage of 75.25% on high criteria. Just as students can identify that Pandeglang and Bogor regencies when viewed from high rainfall based on Koppen climate, Pandeglang and Bogor regions are included in the Koppen Af climate and students can identify that elephants, tigers, one-horned rhinos are among the animals that are in the fauna section of western Indonesia or often called the Asiatic type fauna and students can identify that the characteristics of high rainfall and diverse animals are present in one unit with other regions. Setiawan (2015) revealed that many problems related to the surface of the earth can be solved by students if they have the ability to think spatially, one of which is in the aspect of the region. Marsh et.al (2007) also states that aspects of the region include not only geographical areas, but also other disciplines that make space a factor that can provide an explanation of phenomena such as physics, chemistry, history, and others.

Furthermore, the third indicator is that students can read natural phenomena from a spatial perspective (association/ correlation) with an average percentage of 66.67% on sufficient criteria, such as students being able to read symptoms such as earthquakes that often occur can be caused by clash of tectonic plates or mountains erupts, and students can also know or read symptoms that the symptoms of drought that occur in Indonesia can be caused by El Nino symptoms in the central to the eastern Pacific Ocean. According to Anthamatten (2010), this association aspect is very important for students in understanding the relationship between various phenomena that occur in the same location.

In the fourth indicator, the students are able to show places that are in accordance with (hierarchical) with an average percentage of 76.31% on the high criteria, the area marked on the student map can answer them correctly, students can show the part of the city that is used as the center of a city or economic activity, and students can show the appropriate area when looking at the interpretation of images by looking at the features in the picture. Ozgen (2009) revealed that learning geography using aspects of the hierarchy will provide a good understanding of the material being taught.

In the fifth indicator that students are able to show the special effects of an area on adjacent areas (aura) with an average percentage of 72.88% on high criteria, as well as students can distinguish regional conditions if the region's natural environment changes or changes functions, and students can show the strength of an area if the area has certain characteristics or characteristics, then the population in the region will follow the characteristics or characteristics of the area as if an area has sufficient rainfall, fertile soil, and good water then the area has an average population of livelihoods as farmers or farming as its main livelihood. Learning with this aura aspect according to Anthamatten (2010) will contribute to students to understand the process of various geographical topics.

HYPOTHESIS TEST

Hypothesis testing is performed to determine the relationship between Professional competence of geography teachers according to students' perceptions with students' abilities is spatial thinking done using the SPSS 16 program namely the Pearson correlation test. The following results of the correlation test of geography teacher professional competency according to students' perceptions with students' abilities spatial thinking in Pandeglang District High School are presented in Table 10.

Table 10. Correlation Test Results between the professional competence of geography teachers according to students' perceptions and students' abilities spatial thinking in Pandeglang District High School

Source of Data	N	Pearson Correlation	Sig.	Decision
Data Score Competency Teacher Professional Geography According to the Student Perceptions and Capabilities Spatial Thinking Students	97	0.973	0.000	There is a relationship between professional competence Teachers by Student Perceptions and Spatial Thinking Students

Based on Table 10, the data hypothesis testing performed on the data questionnaire professional competence of teachers based on student perceptions and spatial thinking each student has a significance value of 0,000 which is smaller than 0.05. Furthermore, the value of the degree of correlation (Pearson correlation) between the professional competence of teachers based on student perceptions and spatial thinking amounted to 0.973, so it can be concluded that there is a relationship between the professional competence of teachers based on student perceptions and spatial thinking with a very high degree of correlation.

CONCLUSION

Based on the results of data analysis, it can be concluded that: (1) the average percentage of professional competence of geography teachers according to students' perceptions is 88.23%. with very high criteria; (2) the average percentage of abilities is spatial thinking students' 81.87%. with high criteria; (3) there is a positive relationship between the professional competence of geography teachers according to students' perceptions and students' abilities spatial thinking with a significance value of 0,000 and the value of Pearson correlation 0.973 on very strong criteria.

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