

Metacognitive Ability Relationship with Test Result of Senior High School of Biology Teacher Competence in *Sijunjung* District

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Abstract. This research aimed to reveal how the relationship between metacognitive ability and the test result of biology teacher competence in Sijunjung District. The population of this descriptive research were all high school biology teachers in Sijunjung District, and sample is all teachers who are members of the population, which is 23 biology teachers. The instrument used in this research are a questionnaire of research on teacher's metacognitive ability and document about teacher competence test result. The questionnaire was validated first by two lecturers of biology and one lecturer of English. Data analysis using Pearson Product Moment's. Based on the results of research and discussion that have been described, it can generally be concluded that there is a low relationship between metacognitive ability with competence test results of high school biology teachers in Sijunjung District. Partially, the relationship of metacognitive ability with the test result of professional competence of biology teacher showed significant result, with correlation coefficient 0,46 and t table 1,72 while titung 2,37. The contribution of metacognitive ability to the competence test result of the teacher is 21.6%, while the other 78.4% have not been revealed in this research.

1. Introduction

Education has a strategic role in supporting the progress of the nation. In connection with this, in the Law of the National Education System of the Republic of Indonesia no. 20. Year 2003 [1], stated that education is a conscious and planned effort to create learning atmosphere and learning process so that learners actively develop their potential to have spiritual power, self-control, personality, noble character, and also skills needed himself, society, nation and state.

The educational process begins early on through the tiered stage, to cultivate the interests and talents of learners. On the other hand, parents hope that through education, their children will become useful and skilled and moral. The above expectations and desires are in accordance with the national education function contained in the Law of the National Education System of the Republic of Indonesia no. 20. Year 2003 [1]: "National Education functions to develop the ability and form the character and civilization of dignified nation in order to educate the life of the nation, aiming for the development of potential learners in order to become a man who believes and piety to God Almighty, noble character, healthy, knowledgeable, capable, creative, independent, and become a democratic and responsible citizen".



One way to realize the function of national education is to hold the process of learning in schools, which is implemented by teachers. Based on Law Number 14 Year 2005 on Teachers and Lecturers [2] it is stated that teachers are professional educators with the main task of educating, teaching, guiding, directing, training, assessing and evaluating learners on formal education, and secondary education. Professional teachers proven by their competence will encourage the realization of process and product performance that can support the improvement of education quality. Teacher competence is four, namely (1) pedagogic competence (2) professional competence, (3) social competence, and (4) personality competence. Increased teacher competence is an indicator of teacher professionalism improvement itself. In an effort to improve teacher competence, the government conducted teacher competence test.

The teacher competence test includes pedagogic competence test and professional competence. According to Ministry of Education and Culture of the Republic of Indonesia [3], the desired pedagogic competence is the consistency of pedagogic mastery between content and performance, that is not just the mastery of teachers about the introduction of learners, learning models, planning, implementation, evaluation, but tests that can predict how teachers integrate the five in the implementation of learning. While the professional competence that must be possessed is (1) the mastery of the materials, structure, concepts and mindset of science that support the subjects being taught, (2) Develop profession through reflective action, and (3) Consistency of mastering the material of the teacher between content and performance.

Based on data from the Regional Education Balance of West Sumatera Province 2015 [3], the average of teacher competence test in West Sumatra is 58.37. This value has exceeded the national average of 56.69. The results test of teacher competence test in West Sumatera Year 2016 shows that the average value of biology teacher competence test is still low. The average yield of biology teacher competence test obtained is 60.36 (Education Quality Assurance Agency of West Sumatra, 2016). From 19 districts/municipalities in West Sumatera, there are 6 districts that get low average value. This can be seen in Table 1.

Table 1. The Average of Biology Teacher Competence in West Sumatra

No	Districts	Average Pedagogic Competence	Average Professional Competence	Total Average
1	<i>Kepulauan Mentawai</i>	45,36	50,39	48,94
2	<i>Pesisir Selatan</i>	49,52	51,80	51,11
3	<i>Sijunjung</i>	53,57	55,74	55,09
4	<i>Pasaman</i>	52,71	57,72	56,22
5	<i>Solok Selatan</i>	57,74	55,96	56,49
6	<i>Solok</i>	59,02	59,30	59,21

Source: Education Quality Assurance Agency of West Sumatra (2016).

The low level of biology teacher competence results test can not be separated from the ability of teachers in planning, implementing, and evaluating the learning materials and processes undertaken. Referring to Syaiful [4], this ability is known as metacognition ability. Furthermore, it is stated that the ability of metacognition is basically a consciousness of one's thinking about the process of thinking itself. This includes two components: metacognitive knowledge and metacognitive skills. Metacognitive knowledge deals with declarative knowledge, procedural knowledge, and conditional knowledge. Metacognitive skills are related to planning skills, prediction skills, monitoring skills, and evaluation skills.

Several studies have been conducted by previous researchers about the ability of teacher metacognition. Balcikanli [5] has identified 6 factors that can be used to identify teachers' metacognition abilities. The six factors include, (1) Declarative Knowledge, (2) Procedural Knowledge, (3) Conditiona lKnowledge, (4) Planning, (5) Monitoring, and (6) Evaluating. Furthermore, Daud, Nusantara, and Dama [6] states that the ability of teacher metacognition is very

important to support students' metacognitive ability. Therefore, teacher factor is very important in developing students' metacognitive ability.

Kallio, et al.[7] states that the metacognitive ability possessed by a teacher is very important. This relates to teacher professional development, to reflect on teacher work and support in the learning process.

The low average score of teacher competence test obtained by teachers in some districts in West Sumatra is allegedly inseparable from its association with the teacher's metacognition ability, but scientifically this has not been revealed. Sijunjung District is one of the regions that has an average value of Teacher Competency Exam (UKG) below the average value of the province. This area is an expansion of Sawahlunto Sijunjung district, the education sector is still low, so it has encouraged researchers to examine the metacognition skills of biology teachers related to teacher competence test results. Selection of research sites because of the low level of competence test results of biology teachers and easy to reach by researchers. The other thing that underlies is the limitation of cost and time.

Some teachers in *Sijunjung* District also stated that the low value of UKG is inseparable from the teacher factor itself. Teachers lack preparation in conducting exams and teachers' perceptions that the value gained in influencing their work. Teachers lack the mastery of all material, because the teacher who teaches class X in the school year and then still teach the class.

Based on the problems that have been presented, then has been conducted research on the relationship of metacognitive ability with the results of competence test of biology teacher in *Sijunjung* District.

2. Method

This descriptive research discloses and describes the relationship between metacognitive ability with the results of biology teacher competence test in *Sijunjung* District. The population of this descriptive research were all high school biology teachers in *Sijunjung* District, registered under the Biology UKG 2016. The sampling technique used in this study is Saturation Sampling, where all members of the population sampled are 23 biology teachers.

The author used primary and secondary data. Primary data is the ability of teacher obtained directly to the sample through a questionnaire while the secondary data is a document of teacher competence test results obtained from the Quality Assurance Agency of West Sumatra Province

The questionnaire used in this study were adopted from Metacognitive Awareness Inventory for Teachers (MAIT) [5]. The validity of questionnaire has been done in the validity of the language. Validation results serve as the basis for the revision of the questionnaire using the following formula:

$$\text{Validity value} = \frac{\text{score obtained}}{\text{maximum score}} \times 100\% \quad (1)$$

Maximum score = number of validator x number of indicators x maximum score
Criteria for validity coefficient can be seen in Table 2.

Table 2. Criteria for Validity Coefficients

Validitas Scale	Validity Value
90% - 100%	Very valid
80% - 89%	Valid
65% - 79%	Quite valid
55% - 64%	Less valid
≤ 54%	Invalid (unusable)

Source: Purwanto [8].

Data collected through questionnaires, by spreading statement sheets to be answered by the sample. Then the questionnaire containing the statements answered by respondents with the categories of choice are Strongly Agree (SA), Agree (S), Neutral (N), Disagree (D) and Strongly Disagree (SD). The score of statement are SS 5, S 4, N 3, D 2 and SD 1.

To analyze the relationship of metacognitive ability and result of biology teacher competence test used correlational analysis technique by Product Moment Pearson correlation formula :

$$r = \frac{n\sum xy - (\sum x)(\sum y)}{\sqrt{\{(n.\sum x^2 - (\sum x)^2)\}\{(n.\sum y^2 - (\sum y)^2)\}}} \quad (2)$$

Note:

r = coefficient correlation

x = metacognitive ability

y = result of biology teacher competence test

n = sample

Table 3. Correlation Criteria

r-value	Correlation Criteria
0,00 – 0,20	Very Weak or Very Low so Correlation is ignored
0,21 – 0,40	Weak or Low
0,41 – 0,70	Medium or Fair
0,71 – 0,90	Strong or High
0,91 – 1,00	Strong or High

Source: Sudijono [9]

To determine the correlation coefficient means or not, then tested the correlation coefficient by using the following *t*-formula[10].

$$t = \frac{r \sqrt{(n-2)}}{\sqrt{(1-r)^2}} \quad (3)$$

Note:

t = count value

r = value of correlation coefficient

n = number of samples.

According to Sudjana [10] the correlation of calculated result can be said significant if the value of $t_{\text{count}} > t_{\text{table}}$ at 95% confidence level with db = 21. Then to see the percentage of the extent to which the influence of independent variable X to the dependent variable Y, then use coefficient of determination (P) can be expressed with the following formula:

$$P = r^2 \times 100\% \quad (4)$$

3. Result and Discussion

The result that the authors get after doing the data retrieval of the biology teacher's biology proficiency in *Sijunjung* District, obtained the lowest score range that is 97 and the highest score obtained is 114. From the data analysis obtained the average value of metacognition skills of biology teachers of *SMA Negeri* in *Sijunjung* is 106.6.

Result of data of competence test of high school biology teacher of *Sijunjung* District taken from West Sumatra Educational Quality Assurance Institution 2015, then obtained the lowest value data is

35,7 until its highest value is 77,4. For the average value of *Sijunjung* District Biology Sector is 55.09. This result is below the average value of West Sumatera province that is 60,36. The results obtained from the UKG derived from two competencies namely professional competence and pedagogic competence. Each score of professional and pedagogic competence test is 54.06 and 56.20.

To know the relationship of metacognitive ability with result of UKG biology used Pearson Product Moment correlation formula. Based on the results of the analysis that has been done then in general the relationship between metacognitive ability with the test results of biology teacher competence is 0.36 which means low correlation. Partially, the result of analysis revealed that there is correlation between metacognitive ability with professional competence of teacher that is 0,46 with enough criterion, while metacognition ability with pedagogic competence of teacher there is no relation that is -0,09 with very low criterion. These results indicate that the teacher's metacognitive ability. This means that the ability of teacher metacognition in this case more shows the correlation with teacher competence test results, in the professional field, compared to pedagogic.

Based on the results of this partial analysis, then tested to determine whether there is a significant relationship between metacognitive ability with the results of teacher professional competence test. The result shows that the significance of metacognitive ability with professional ability of teacher is 2.38, with $db = 21$; $t\text{-table} = 1, 72$. This result is greater than $t\text{-table}$ value, meaning that there is a significant correlation between metacognitive ability and professional ability test result of high school teacher in *Sijunjung* District.

Furthermore, to know the donation given the ability of teacher metacognition to teacher profesional competence, conducted determinant analysis. The result of the analysis shows that the teacher metacognitive ability contributes 21,16% to the professional ability of high school biology teacher in *Sijunjung* District.

Through this study found a picture of the ability of teacher metacognition and its relationship with the results of competence test of high school biology teachers in *Sijunjung* District. Based on the results of this study it was revealed that the ability of teacher metacognition, enough to show the linkage with the results of professional competence test teachers, while with the results of teacher competence test pedagogic, very low.

Referring to Law Number 14 Year 2005 regarding Teachers and Lecturers, it means that the teacher is sufficiently able to master the broad and deep learning material that includes the mastery of curriculum subject material in the school and the scientific substance that oversees the material. In other words, it can also be stated that the teacher's metacognitive ability has enough correlation with the ability of the teacher to master the source of the teaching materials or the field of their expertise study. In this connection Kallio, et al.[7], stated that the teacher's metacognitive ability in developing teacher professional competence is important. This metacognitive ability is the key for a teacher to reflect on their own work and support the learning process.

Judging from the results of teacher pedagogic competence test, it is revealed that the ability of biology teacher metacognition in *Sijunjung* District shows very low relationship with teacher competence test results pedagogically. Based on Law Number 14 Year 2005 on Teachers and Lecturers, this means that teachers 'metacognitive ability has a very low relationship with teachers' understanding of learners, the design and implementation of learning, evaluation of learning outcomes and the development of learners to actualize various the potential it has. Very low correlation between teacher metacognition competence with teacher pedagogic ability test result, allegedly will be closely related to learners learn result. In this regard, Daud [6], stated that teacher pedagogic competence is the main component to support the success of learners. Nevertheless in this case has not done further study.

Metacognitive ability that must be possessed by teacher is not just metacognition knowledge but also teacher metacognition skill in learning design which must be done by teacher well. Knowledge of metacognition of this teacher will be able to solve the problems faced by teachers in the learning process. This is supported by a statement from Kallio et al.[7], that this metacognitive ability is the key for a teacher to reflect on their own work and support the learning process.

The result of Soekisno's research [11], that metacognitive ability to explore teacher perception based on teaching experience and teacher's knowledge. By knowing the ability of teacher metakognisi hence in process of learning should teacher can dig knowledge and skill of teacher in preparing lesson. Teachers are able to optimize their capabilities. In harmony with this, Sumampouw [12] states, that in learning metacognitive knowledge possessed by a person related to his beliefs about intelligence, how conscious, his knowledge of the level of difficulty of tasks done in his own way is considered best to be able to solve them.

The result of correlation analysis with Pearson Product Moment formula did not show correlation between metacognitive ability with pedagogic competence result of biology teacher. This is because metacognition skills include planning, monitoring and evaluation. Based on the results of discussions with several teachers revealed that the plan they do only in a short time and not optimal. For supervision, teachers often neglect to do so, it is rare for teachers to evaluate what they have done.

Livingstone in Sumampouw [12] states that metacognition skills are the sequential process processes used to control cognitive activities and ensure that cognitive goals have been achieved. These processes consist of planning and monitoring of cognitive activities and evaluating the outcomes of these activities.

The result of t-test showed that there is a significant correlation between metacognition ability and biology teacher competence test result, especially professional competence. This means that the better the teacher's metacognition ability, the better the teacher professional competence test results

4. Conclusion

Based on the results of research and discussion that have been described, it can generally be concluded that there is a low relationship between metacognitive ability with competence test results of high school biology teachers in *Sijunjung* District. Partially, the relationship of metacognitive ability with the test result of professional competence of biology teacher showed significant result, with correlation coefficient 0.46 and t-table 1,72 while t-count 2,37. The contribution of metacognitive ability to the competence test result of the teacher is 21.6%, while the other 78.4% have not been revealed in this research.

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