The Analysis of Scientific Writing Ability and It’s Relations
Student Creativity

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Abstract
Writing is one of the most important and fundamental activities in education. In addition to writing, creativity is also needed. Therefore, research involving 27 respondents in STKIP Subang is to see how the level of writing ability and creativity of prospective teachers. Based on the exposure and discussion it can be concluded that the ability of prospective teachers in writing scientific worksheet and handout is influenced by the level of creativity. The students’ scientific writing ability is still dominated by groups with the category of "medium" category. Next 11 people or about 40.7%. While the level of creativity is dominated by groups with categories of "low", i.e as many as 13 people or about 48.14%. The correlation results show that the two variables interact with the correlation level reaches 0.921 with Sig. (2 tailed) 0.000. This means the higher the level of creativity then it wills also the better scientific produc it developed. In order to improve writing and creativity more optimally, the program must be carefully planned, implemented systematically and evaluated continuously.

Keywords: Ability to write scientific, creativity, STKIP Subang

1. Introduction
One of the most important activities in education is writing. Writing activities have been taught early on in a formal education, from primary school to education even at the level of Doctorate. However, to produce scientific and quality papers is not easy. This is in line with the explanations of Cahyani and Hodijah (2007), and Tarigan (2008) that writing is a complicated and difficult skill, this is because not just copying letters, words and sentences, but involving deep thought and related knowledge or knowledge others.

The complexity of writing is also expressed by Iskandarwassid and Sunendar (2009) that "writing skills are more difficult than other skills because writing skills require mastery of various linguistic elements and outside elements of language". The most intricately active productive writing skills are mastered among other skills. As a result, elements from outside the language that lead the author express feelings, thoughts, and how to express them in writing if there is no interest, talent, ideals and diligent reading. Semi (2008) reveals that “most authors have succeeded, they have the requirements to be authors, i.e 1) interest, 2) talent, 3) ideals and 4) diligent reading.” Furthermore, the cause is the language elements; the idea is expressed carefully, arranged in a systematic and accurate word selection according to the rules of language.

Associated with writing activities, Suriamiharja (1997) said that activities are a combination of thoughts and feelings. In other languages mentioned that writing is one way to communicate to express thoughts, feelings and desire or the will to others, in this case is the reader. This is consistent with what Kurniawan (1998) explains that writing is one way or form of thinking with certain patterns. Therefore it can be said that writing is not merely to represent letters alone.

To produce good and quality writing requires an adequate writing skill. Skills for putting ideas, ideas, and thoughts into symbols (letters, numbers and other symbols) are basic writing skills. Therefore, writing skills is one of the skills that are productive and expressive. This is in accordance with the explanation Tarigan (2008) that writing is one activity that is productive and expressive. The productive nature of writing is in the process of conveying thoughts, ideas, ideas or feelings through written suggestions. As for the expressive nature of the intent is that every writing generally represents the feelings of its authors.

Referring to the description above, that writing skills is one of the relatively difficult and complicated skills. Therefore, writing skills need to get serious attention from other teachers and teachers. This is based on the opinion Suyatinah (2005) said that without having adequate writing skills from an early age, children will have learning difficulties in the future. Thus writing skills must be trained and accustomed since basic education so that they do not experience difficulties when they are in college (university)

To master writing skills, practice and practice seriously is one of the ways in which students (students and students) must go. This is in line with Dawson's opinion (in Tarigan, 2008) that one form of activity for mastering writing skills is practice and practice activities to acquire writing mastery. The opinion is also in line with the explanation of Akadiah (1988) which explains that writing is not a skill acquired by genetics, but the result of a long and sustained learning process. Thus, to have good writing skills requires practice and perseverance.

As above mentioned, writing skills is one of the most important skills and must be possessed by every learner, from basic education, from middle to university level. At the university level, writing skills are crucial to the success of the education program itself. As it is known that undergraduate level education programs (in every
As the above opinion, according to Cambell creative process has certain sequences, namely:

1) Preparation, i.e laying the foundation, studying the background of the problem, the ins and outs and the problematic. Although not all creative experts, but most creators are experts. The brilliant breakthrough in a field is almost always generated by people who have long been in the field and long thought in that field. Preparation for creativity is mostly done on the basis of "interest". The success of great men is attained and endured, not by a sudden jump, but with great effort.

2) Concentration, which is entirely thinking, melting, absorbed in the case at hand. Creative people are usually serious, their attention gushing and their minds focused on what they do. The concentration stage is the time of concentration, the time to weigh, the test time, the initial time to try and experience failure, trial and error.

3) Incubation, which takes time to leave the case, rest, leisure time. A bow cannot be stretched continuously for the long term without breaking danger. Then we need to escape from the matter we are solving, the problem we are about to solve. Incubation is a time where little by little we are free from the routine of thinking, working habits, ordinary users.

4) Illumination, which is getting ideas of ideas, solutions, solutions, workings, new answers. The most enjoyable
part of creation, the illumination stage. When everything is clear, the connection of the matter of the gambling, and the illumination to the problem solving, the new answer suddenly looks like lightning. The reaction of success is usually not only the inner core, but also expressed out physically.

5) Verification / Production: make sure whether the solution actually solves the problem. The illumination stage, however satisfying, is only the end of a beginning. There is still a lot of work to do. When we come up with ideas, ideas, solutions, new ways of working, we need to intervene to make it happen. Work skills are an important part of creative work. No matter how many ideas, ideas, inspirations, good dreams are found, if they cannot be realized, they will all disappear like dew hit by the sun. So creative people must have the work skills both personally and in groups.

To find out a person's level of creativity, Cambell elaborates that the person who is creativity has special characteristics or characteristics. Characteristics or characters are grouped into three categories: (1) the character, which is the key to the birth of ideas, ideas, inspirations, solutions, new ways, discoveries, (2) possible characters: which make capable of maintaining creative ideas, once have been raised alive, and (3) side characters: not directly related to the creation or keeping the found ideas alive, but often affecting the behavior of creative people. Specifically, the character of creativity can be seen in Table 1 below:

<table>
<thead>
<tr>
<th>Main Character</th>
<th>Possible Characters</th>
<th>Side Characters</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Divergent thinking</td>
<td>2. Think independently</td>
<td>2. Psychological chaos</td>
</tr>
<tr>
<td>3. Conceptual flexibility</td>
<td>3. Abstain to surrender</td>
<td></td>
</tr>
<tr>
<td>4. Originality</td>
<td>4. Able to communicate well</td>
<td></td>
</tr>
<tr>
<td>5. Prefers complexity rather than simplicity</td>
<td>5. More interested in concepts than detail</td>
<td></td>
</tr>
<tr>
<td>7. multiple skills</td>
<td>7. Rich in humor and fantasy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. Not immediately reject new ideas or ideas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9. The direction of a solid life</td>
<td></td>
</tr>
</tbody>
</table>

In line with the above opinion, Reni (2001) describes the character of creativity as follows: (1) has a deep curiosity, (2) often asks a weighty question, (3) gives many ideas, proposes to a problem, (4) able to express opinions spontaneously and unabashedly, (5) have / appreciate a sense of beauty, (6) stand out in one or more fields of study, (7) can seek solutions from various aspects, (8) have a sense of humor (9) has the power of imagination (e.g thinking of new and unusual things), (10) capable of proposing ideas, different problem solving ideas with others (original), (11) fluency in generating ideas, (12) able to face problems from different angles of view.

To determine a person's level of creativity, measurements are required. According to Cony (1984) measurement of creativity can be done through certain approaches. There are five ways or approaches often used to measure a person's creativity: 1) objective analysis of creative behavior, 2) subjective considerations, 3) personality inventory, 4) biographical inventory, and 5) creativity tests. Thus, to know the level of creativity one can be measured using one of the five approaches above.

As already noted above, one way of knowing a person's level of creativity is to do a creativity test. This test is used to identify creative people who are demonstrated by their ability to think creatively. The test results are converted to a certain scale to produce CQ (creative quotient) analogue to IQ (intelligence quotient) for intelligence. There are several creativity tests, namely: alternate uses, test of divergent thinking, creativity test for children (Torrance, 1974), creativity assessment packet (Williams, 1980), verbal creativity test (Munandar, 1977). Form of test questions are generally in the form of images and verbal. Differences in intelligence tests with creativity tests, namely on the answer criteria. Intelligence tests test the ability to think center (convergent), therefore there are right and wrong answers, whereas the test of creativity tests thinking is diverging and there is no right or wrong answer.

2. Research Methods

Research design is used to prepare research activities so that researchers can obtain valid data and in accordance with the variables and research objectives. This research uses correlational descriptive research model. Setyadin (2005) states that descriptive research is research that aims to describe the characteristics of frequency and distribution. Descriptive research intends to explore further a problem. Characteristics of research and distribution of frequency obtained based on the results of the analysis of research instruments. Arikunto (1998) states that correlation research aims to find the relationship between several variables, and if there is a relationship on the variables studied can be known whether or not the relationship closely and whether or not the relationship existed in the variables studied.
This research has purpose to know the correlation of variables measured quantitatively. The existence of the correlation coefficient can compare the measurement results between the three variables in order to determine the level of relationship between the three variables (Arikunto, 1998). In the study, the variables that will be measured are the students' scientific writing (X) and creativity (Y).

In this study, the samples used were all students of STKIP Subang majoring in Elementary School Teacher Education (PGSD) semester VI, academic year 2017/2018 which amounted to 27 people. It is based on the consideration that in that semester, all students of STKIP Subang are ready to do field practice, so that they have mastered and ready to practice teaching. The material that will be the object of this research is the science materials that have been studied by students in the previous semester.

The data of scientific writing ability is obtained by measuring. Measurement of scientific writing ability is done by using instrument in the form of rubric. Rubric is used to measure the scientific products produced by STKIP Subang students, the product is in the form of teaching materials (student worksheet and Handout). The rubric used consists of a statement that has a score with a score of five (5) if all indicators are met, a score of four (4) if one indicator is not met, three (3) if two indicators are not met, a score of two (2) if there are three unfulfilled indicators, and a score of one (1) if there are four (4) unmatched indicators. The instrument consists of twenty (20) statements, whereby the maximum score to be obtained by the student is 100 points and the minimum score is 20 points.

The creativity data, obtained through the test. The test instrument used is a Verbal Creativity Test developed by Munandar (1999) with some modification and adaptation. This test is based on the Intellectual Structure model of Guilford, with divergent thinking operating dimensions, content dimensions, verbal thinking dimensions, and different in product dimensions. For each product category there is one sub-test. There are six sub-tests, namely the beginning of words, composing words, forming three-word words, similar traits, kinds of usage, and what consequences. Each sub-test consists of four items. In the form of parallel (there are two forms) only two grains. This test is to measure fluency, flexibility, and elaboration in thinking. At the end of the test, students will get a creativity score between 0 to 100 points.

In this article, students' scientific writing ability and creativity ability are grouped into three categories based on the scores on test with the following conditions

<table>
<thead>
<tr>
<th>No</th>
<th>Category</th>
<th>Score</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>High</td>
<td>≥ 85</td>
<td>Measurements are based on students' scientific products</td>
</tr>
<tr>
<td>2</td>
<td>Medium</td>
<td>60 ≥ x ≤ 84</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Low</td>
<td>≤ 59</td>
<td></td>
</tr>
</tbody>
</table>

The analysis used to discuss the existing problems and answer the hypothesis that has been proposed is descriptive statistics method, with the help of computerized system (Computer Program SPSS version 12) by using the formula that is correlational regression analysis between students' scientific writing ability to creativity. The correlation relationship is then tested by t test. The t test is used to prove whether there is an influence between students' scientific writing ability (X), on student creativity (Y).

3. Results and Discussion
3.1. Research data
a. Scientific Writing Capability of STKIP Subang Students
as has been described above that, the sample used is all students Subang STKIP Elementary School Teacher Education (PGSD) semester VI, academic year 2017/2018 which amounted to 27 people. It is based on the consideration that in that semester, all students of STKIP Subang are ready to do field practice, so that they have mastered and ready to practice teaching. The material that will be the object of this research is the science materials that have been studied by students in the previous semester. Based on the results of the analysis of scientific papers that have been developed by the students in the form of student worksheets and handouts, the general ability of student writing skills can be seen in Table 3 below:

<table>
<thead>
<tr>
<th>No</th>
<th>Interval Score</th>
<th>Category</th>
<th>Total Respondent</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>≥ 85</td>
<td>High</td>
<td>9</td>
<td>33.33%</td>
</tr>
<tr>
<td>2</td>
<td>60 ≥ x ≤ 84</td>
<td>Medium</td>
<td>17</td>
<td>63%</td>
</tr>
<tr>
<td>3</td>
<td>≤ 59</td>
<td>Low</td>
<td>11</td>
<td>40.7%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>27</td>
<td>100%</td>
</tr>
</tbody>
</table>
Figure 1. Student Scientific Writing Ability Scale Diagram

Based on Table 3 and Figure 1 above seen 17 respondents or about 63% of students prospective teachers STKIP Subang have the ability to write scientific papers with the category "medium". Furthermore, 11 people or about 40.7% of students have the ability to write scientific with the category "low" and the rest as many as 9 people or about 33.33% "high".

b. Level of Student Creativity STKIP Subang

Based on the results of creativity tests that have been done to all samples, as many as 27 people with a test instrument developed by Utami Munandar (1999) in the form of Verbal Creativity Test with some modification and adaptation. As described above, creativity tests are used to measure fluency, flexibility, and elaboration in thinking. After the test is done, then the results can be seen in Table 4.

Table 4. Student Creativity Level STKIP Subang

<table>
<thead>
<tr>
<th>No</th>
<th>Interval Score</th>
<th>Category</th>
<th>Total Respondent</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>≥ 85</td>
<td>High</td>
<td>4</td>
<td>14.81%</td>
</tr>
<tr>
<td>2</td>
<td>60 ≥ x ≤ 84</td>
<td>Medium</td>
<td>10</td>
<td>37.05%</td>
</tr>
<tr>
<td>3</td>
<td>≤ 59</td>
<td>Low</td>
<td>13</td>
<td>48.14%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>27</td>
<td>100%</td>
</tr>
</tbody>
</table>

Figure 2. Student Creativity Rate Bar chart

As in Table 2 and Figure 2, it can be seen that in general the level of creativity of prospective teachers in STKIP Subang is in the "low" category, i.e as many as 13 people or about 48.14%. Students who have the ability with the category "medium" as many as 10 people or about 32.05%, while the student candidate teachers who have creativities with the ability "high" as many as 4 people or about 14.81%. Thus it can be said that the average student prospective teachers in STKIP Subang relatively not satisfactory.
c. The Relationship between Scientific Writing Ability and Student Creativity

STKIP Subang

Table 5. Correlations of Scientific Writing Ability and Creativity Level

<table>
<thead>
<tr>
<th></th>
<th>Scientific Writing Ability</th>
<th>Creativity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scientific Writing Ability</strong></td>
<td>Pearson Correlation</td>
<td>Sig. (2-tailed)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creativity</td>
<td>Pearson Correlation</td>
<td>.921**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>26</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

Based on Table 5, it can be understood that the correlation between scientific writing ability and the level of creativity of STKIP students is very high, that is, 0.921. With Sig value (2-tailed) 0.000, which means <0.05 or very significant. Processing of correlation value proves that variable writing ability and creativity level very closely. Both variables affect each other. Improving the ability of scientific writing will also increase the level of creativity, and vice versa.

3.2. Discussion

Referring to the data presented above, shows that the average ability of prospective teachers in STKIP Subang in writing scientific papers is in the form of student worksheets and handouts are still classified as "moderate", i.e. 17 respondents or about 63%. The ability of STKIP Subang student candidates in writing scientific papers can be seen in Table 1 and Figure 1. The results are based on the results of the assessment and analysis of students' work in the form of student worksheets and handouts.

As the writing ability, the level of creativity of prospective teachers in STKIP Subang also vary. However, based on Table 2 and Figure 2, the level of creativity of prospective teachers in STKIP Subang is in the "low" category, which is 13 people or about 48.14%. Students who have the ability with the category "medium" as many as 10 people or about 32.05%, while the student candidate teachers who have creativities with the ability "high" as many as 4 people or about 14.81%.

The results of the assessment and tests of both variables above, namely, the ability to write and the level of creativity and then correlated. The result of the correlation of both variables is 0.924. The value proves that the ability of scientific writing has a strong relationship with the level of creativity. In other words, the two variables, namely the ability to write scientific and the level of creativity affect each other.

Based on the findings of research results as the data above, that students' scientific writing skills, especially in the development of teaching materials, namely student sheets and handouts still need to be improved. Given writing (scientific work) is one of the most important activities to support the smoothness of the education process of the students, then the real effort in improving scientific writing is a must. Increasing the ability of scientific writing will indirectly increase the level of student creativity.

Remembering writing is a difficult and complicated activity as Cahyani and Hodijah (2007) have taught, and Tarigan (2008) that writing is a complicated and difficult skill. Sunendar (2009) also mentions that writing skills are more difficult than other skills. Therefore, in improving students' writing skills, it is necessary to have a systematic and systematic planning. This is because writing involves interest, talent and so on, as revealed by Semi (2008) that the author or authors who has been successful, involves several things: 1) interest, 2) talent, 3) ideals and 4) diligent reading.

As has been described above that the scientific work has characteristics different from other writings. Scientific works have different characteristics or characteristics, as presented by Doyin and Wagiran (2009) that scientific papers have characteristics: (1) contains facts that can be verified, (2) supported by existing theory, (3) not emotional, (4) using scientific language rules, (5) following a predetermined systematic, (6) proportional, (7) having a clear reference, (8) being consistent. Therefore, in developing the ability to write scientific work of students in STKIP Subang needs to consider characteristics of the scientific work itself. It is intended that the scientific work of the development of students has a good quality.

Improving the ability to write indirectly will increase the level of student creativity. The data in Table 5 shows that the correlation between the ability of scientific writing and the level of student creativity is significant. The results are not surprising given the scientific work has the characteristics or nature of the content that forces writers to be creative. This is in line with the opinion of Doyin and Wagiran (2009) that the characteristics of the content of the work must satisfy the following requirements: (a) original, original (not plagiarized) works and never published, (b) critical, current or actual issues and issues supported by scientific arguments, (c) creative, innovative, and applicative, containing creative or innovative ideas or ideas that offer solutions or anticipate an
existing, (d) logical and systematic problem that each step the writing of works is designed with a clear and coherent systematic, written supported by reliable data and information and can be accounted for or verified, (e) objective, not emotional or not highlight subjective problems.

On the other hand, when referring to Munandar's (199) opinion on the components of creativity, it is mentioned that creativity has the compound: (1) fluency of thinking, ie the ability to generate new ideas smoothly and does not take too long to produce such ideas, (2) flexibility, that is, the ability to think from different points of view and not just fixed or centered in one direction only. The creative individual is a flexible person in thinking, (3) elaboration, the ability to develop ideas and add or itemize details of an object, idea or situation so that it becomes more interesting, and (4) originality, i.e the ability to spark ideas unique or ability to trigger original ideas. Thus, it can be understood that creative people will be able to produce scientific papers more quickly, accurately and qualified than the less creative ones.

According to Porter and Hernacki (2001), the process of creativity arises through certain stages: (1) preparatory stage, namely: defining problems, goals, or challenges, (2) incubation stage, i.e the stage of digesting the facts and processing them in (3) the stage of illumination, i.e urgent surface, ideas emerging, (4) verification stage, i.e ensuring whether the solution really solves the problem, and (5) the application stage, that is, taking steps to follow up the solution. Therefore in an effort to improve students' scientific writing skills can also be started from improving creativity. Enhancement of student creativity can be done by considering the expert opinion above.

4. Conclusions and Recommendations

4.2. Conclusion
Based on the exposure and discussion it can be concluded that the ability of prospective teachers in writing scientific worksheet and handout is influenced by the level of creativity. The students' scientific writing ability is still dominated by groups with the category of "medium" category. Next 11 people or about 40.7%. While the level of creativity is dominated by groups with categories of "low", i.e as many as 13 people or about 48.14%. The correlation results show that the two variables interact with the correlation level reaches 0.921 with Sig. (2 tailed) 0.000. This means the higher the level of creativity then it wills also the better scientific product that developed.

4.3. Recommendation
From the results of the research as described above, it is necessary to develop the ability of prospective teachers in STKIP Subang in scientific writing. Capability development can be done by debriefing, either intra (in the process of lecturing) or extra (outside of lecturing process). Scientific literacy and creativity improvement programs can be done together, this is because the two variables are mutually tied and influenced. In order to improve writing and creativity more optimally, the program must be carefully planned, implemented systematically and evaluated continuously.

In addition, considering these two variables is very important that supports the success of students, both during the process of education on campus or outside the campus, it is necessary to conduct a more in-depth study related to both variables. Therefore, it is necessary to conduct further research, especially related to the development of students' writing and creativity improvement program. With the holding of such research, a suitable model or approach will be found to improve scientific writing and creativity.

References

