

Analysis of Scientific Processing Skills and Its Corelation with Cumulative Achievement Index

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Abstract: This study aims to determine the profile of students' science process skills (SPS) and their correlation with Student's Achievement Index (CAI) in Biology Student of FKIP University of LancangKuning Academic Year 2016/2017. Data retrieval was conducted in March 2017 using an instrument of science process skill with 7 indicators. This research uses descriptive quantitative approach with regression correlation method to see the relation between student science process skill and cumulative achievement index. Data analysis is done by descriptive percentage and using Product moment correlation. The result of the research shows that the value of scientific process skill of students is in the category of less. Students with a high cumulative achievement index also get higher scores than low and medium-sized students cumulative achievement index. The semester VI students have the highest scientific process skill with enough categories. Cumulative achievement index has a significant relationship with KPS with a strong relationship category of 0.721.

Keywords: science process skills, cumulative achievement index

1. Introduction

Education is essentially a process of human maturity. Educational institutions are one place to run the process. FKIP LancangKuning University is the Faculty for Educational Teaching Education (*in bahasa; Lembaga Pendidikan Tenaga Kependidikan (LPTK)*) which aims to produce superior educators in order to achieve a better quality of education. Better quality of education at the LPTK level will be achieved if the curriculum is used according to the demands of the times. The curriculum developed at LPTK is currently the Indonesian National Curriculum Framework (*in bahasa; Kerangka Kurikulum Nasional Indonesia (KKNI)*). Experts that challenge the students' enthusiasms and attitudes toward science are caused by the failure of universities or LPTKs in preparing educational personnel who are able to transform science effectively and innovatively. LPTK success indicator prepares a good educator, one of which can be seen from the index of student's achievement cumulative.

The index of cumulative achievement is a weighted value obtained from the calculation of semester credit unit load that has been completed multiplied by the weight of the value of each course. In addition to CAI, an education must also have other skills to be a superior educator, one of which is the science process (SPS). Most of the subjects taught biology skills are accompanied by practicum activities because skills can only be obtained by hand on and mind on activities. Biology education students should have a balance between theoretical and practicum in the learning activities because they cannot be separated. Students, who have a good CAI, are usually directly proportional to their CAI, but students who have a poor CAI may not necessarily have less good SPS. The quality of the science process skills is determined how learners are trained and educated. Based on the above background it is necessary to do research about the skill profile of the students' science process and its correlation with the CAI of the students of Biology Education Program of FKIP University of LancangKuningPekanbaru.



2. Research Method

This research uses descriptive quantitative. Approach with regression correlation method to see the relation between GPA with skill of student sains process. This research was conducted on March 2017 at the Faculty of Biology Education Program of FKIP University of LancangKuning. The population in this study is students of semesters II, IV and VI which are categorized into three classes namely students who have low, medium and high CAI. The student has a low CAI if his CAI ranges from 2.00-2.75, medium category if GPA is 2.76-3.50 and high category if the CAI is ≥ 3.51 , the sample is selected by using total sampling technique. One of the total sample selection objectives according to Sugioyono (2012) is because the population is not too much and gets a picture of the characteristics of a more representative population. All populations were sampled with high IPK category of 68 people, SPS category was as many as 82 people while low CAI category as many as 30 people. So the total sample to be taken in this study is as many as 180 students. The instrument to be used in this study is a mater of science process skills consisting of several SPS indicators: interpretation, prediction, questioning, hypothesis, communication, conclusion and planning of the study (modification of Fatmawati without years). The indicator will be made in the form of 12 types of multiple choice questions.

Data analysis technique of research result in the form of SPS skill test will be processed using formula:

$$S = \frac{\text{the amount of the right answer}}{\text{number of wrong answers}} \times 100$$

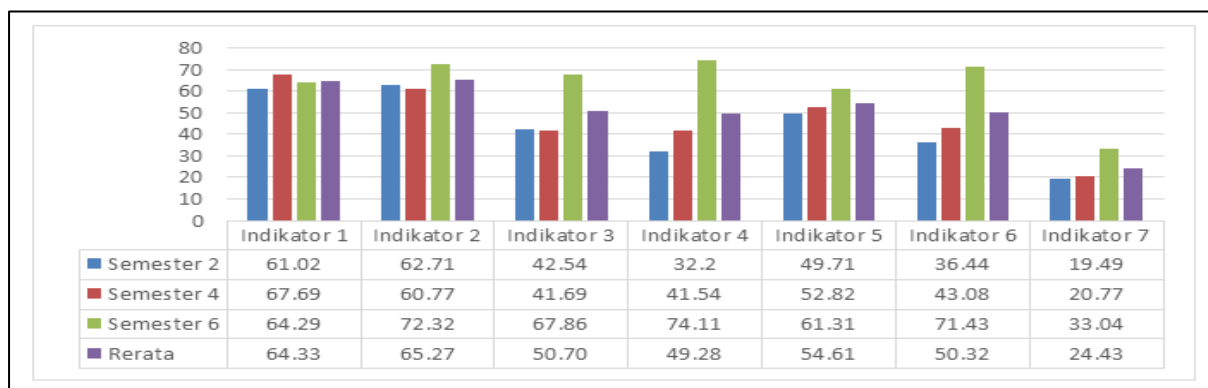


Chart 1. Data 1

Score	Category
86 – 100	Very Good
76 – 85	Good
60 – 75	Fair
55 – 59	Less
≤ 54	Bad

Figure 1. Scoring

After obtained the data of science process skill then followed by prerequisite test on linear regression model data analysis. Prerequisite test, including: normality test and simple linear regression test. By the formulawith:

Y '= predicted value

A = constant or if price $x = 0$

B = regression coefficient

X = value of independent variable

To see the correlation coefficient is significant or not, then proceed with using t test. If significant correlation coefficient, magnitude influence between variables can be searched with coefficient of determination, with the formula:

$$r_{xy} = \frac{\sum xy}{\sqrt{(\sum x^2)(\sum y^2)}}$$

To see the correlation coefficient is significant or not, then proceed with using t test. If significant correlation coefficient, magnitude influence between variables can be searched with coefficient of determination, with the formula:

$$D = (r_{xy})^2 \times 100\%$$

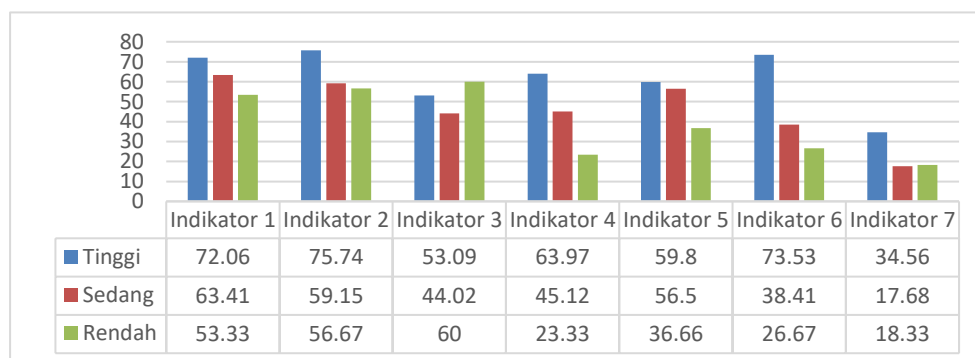


Chart 2. the correlation coefficient

3. Results

At figure 3.1 show the highest score lies in indicator 2 with an average value of 65.27, while the lowest score is in indicator 7 with an average value of 24.43. In addition, it can be seen that the value of SPS semester 6 is higher than semester 4 and 2 on all indicators except indicator 1. In indicator 1, the value of 4th semester of 4 is higher than the other semester.

6th semester students have higher KPS than the 2nd and 4th semester students on all indicators except indicator 1. In indicator 1, student 4th semester is higher than the other two semesters with average of 67.69 (fair/ enough). Ability to use the concept / principle occupies the lowest value in each semester with an average of 24.43 (less once). While the highest average is on the prediction indicator 65.27. Overall the sixth semester students had a higher KPS score than the other 2 semesters of 63.48 (enough). This is because students of semester 6 have a lot of experience in doing various science processes during lectures. States that KPS can be improved through various experiences [13]. Description: Indicator 1: Interpretation; Indicator 2: Prediction; Indicator 3: Communicate; Indicator 4: Hypothesis; Indicator 5: Planning the Trial; Indicator 6: Asking Questions; Indicator 7: Implementing Concepts / Principles.

Figure above shows the indicators that indicate a positive relationship between CAI and SPS, ie the higher the CAI then the higher the SPS is also the indicator 1, 2, 4, 5 and 6 while 2 other indicators indicate that the CAI does not affect its SPS indicator 3 and 7. But there is no single

indicator showing a negative relationship between CAI and SPS score. The students have high CAI its also have value high SPS. The category, it shows during the process of learning activity on campus, student less get training related to its KPS. In fact, in biology, KPS should be one of the mainstay approaches in its learning. According to Rustaman [13], that teaching science process skill means equally teaching participants how a science is found. A skill will not be able to be mastered without training, as well as science process skills, science process skill indicators require different treatment according to their individual characteristics. SPS can be developed with a variety of learning arts that can develop questions-making skills, hypothesize, plan experiments, communicate, interpret and make conclusions but cooperative models help learners to practice communication skills, inter-personalize and apply concepts. In addition to applying a supportive method / model, continuous training is needed to familiarize learners in mastering the skills of this science process in line with research conducted by Anggraini [2]; and Astari [4] indicating that learning methods / models can improve the scientific process skills of different indicators.

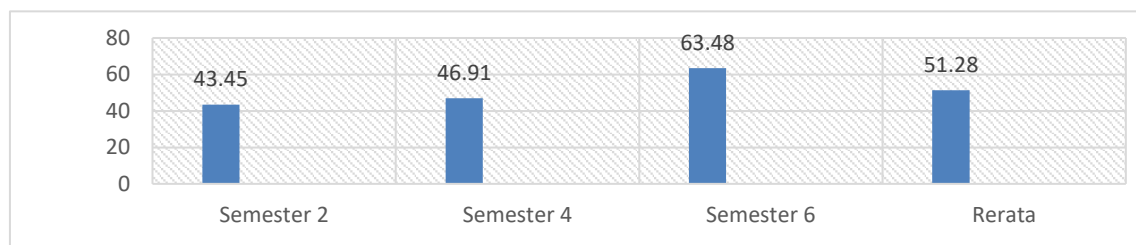


Chart 3. The score in every semester

Tabel 3.1 Value korelation

IPK		Nilai KPS
	Pearson Correlation	0.721
	Sig (2-tailed)	0.00
	Kontribusi	10.2%
	N	180

All Asymp.Sig (2-tailed) IPK and KPS categories are greater than α (0.05) so it can be concluded that IPK and KPS data are normally distributed. Because data is normally distributed, it can be continued with Pearson Product Moment correlation test. Test this correlation to know the relationship between KPS with student's IPK in semester 2, 4 and 6. There is a positive correlation between IPK and KPS value. The relationship of IPK to the value of KPS is significant at 0.05 significance level with strong relationship category (0.721) although the relationship between the two is strong enough but the GPA only contributes 10.2% of the increase in KPS value while 89.8% is determined by other factors. Because the relationship is both significant, it can be continued with a linear regression test for Looking at the size of a variable affects other variables. CAI has significant relationship to science process skill, but based on regression test shows that GPA only affects other skill improvement by 10.2% while 89.8% is influenced by other factors such as manual skills, social skills, Learning methods and models, continuous exercises, material given (from questionnaires that show genetic material and photosynthesis more difficult than other material) and other factors.

The constants are not significant with Sig. Of $0.210 > 0.05$ this means the constant (a) does not affect the increase in the value of student KPS while the student KPS is significant with the value

of Sig. Of $0.000 < 0.05$, this means the increase in the value of KPS is determined by the student's GPA. Based on Table 4.3 can be written regression equation as follows: $Y = 2.415 + 0.018X$.

Sains Skill process is skills that everyone possesses whose development requires training. According to Rustaman, scientific process skills involve other skills of cognitive or intellectual skills, social skills and manual skills. Intellectual skills are involved because every process (skill process) students require their intellectual to do so, as well as other skills such as manual skills needed when the use of tools and materials and social skills is needed when carrying out learning activities eg discussing observations.

The KPS approach is not much different from the Science A Process: Approach (SAPA) Which is a science-oriented approach to learning. However, KAP and SAPA have differences that SAPA does not attach importance to the concept, requiring the development of the whole process with scientific method in every learning implementation, while the types of process skills in the KPS approach can be developed separately depending on what method is used. For example demonstration methods can develop specific KPS indicators such as observation, interpretation, communication and application of concepts (Rustaman, 2003). Based on the results of research that has been presented in the above section can be seen that overall IPK affects the science skills of students. From the data Figure 3.1 can be seen that the IPK shows a positive relationship with student KPS. In general on each indicator, students with high IPK also have higher KPS scores compared to low and middle students. And in Table 3.1 reinforces the positive relationship tendency through correlation analysis. IPK has positive relationship with KPS with strong relationship category (0.721). A positive relationship indicates that every higher one's IPK the better the science-process skill it has. This result is in line with Rustaman's [11] statement that the skills of the process of science require other skills of cognitive or intellectual skills, manual skills and social skills. Although cognitive skills affect the skills of the science process, we can not ignore other skills, in the sense that all skills are needed to develop the skills of the scientific process as a whole. In Table 3.1 It can be seen that the GPA only contributes very little to the KPS increase of 10.2%, while 89.8% is influenced by other factors such as manual skills, social skills, model / learning method and continuous training. This is in line with [12] assertion that any particular model / method will be able to develop certain skills in other words that to develop KPS in order to require a variety of learning methods / models. Most SPS indicators have a positive relationship with CAI, including interpersonal skills, predictions, hypotheses, plotting experiments and the ability to ask questions. Students, who have a high SPS, have higher interpretation skills as well than with low and low SPS students. The same fact is also found in 4 other SPS indicators.

4. Conclusion

Based on data analysis, it can be concluded that the value of student SPS is in the category of less once with the average of 51.28. Students with a high CAI also get higher SPS scores than low and medium-sized CAI students. The semester VI students have the highest SPS average of 63.48 with enough categories. CAI has a significant relationship with SPS with a strong relationship category of 0.721.

5. References

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