**MULTIDISCIPLINE - International Conference 2021**
December 18th 2021, Page. 11 - 16
*E-ISSN: 2809-6142*

# The Correlation Between Processing Skills and Learning Outcomes Based on Implementation Discovery Learning

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## ABSTRACT
*This research is a classroom action research that aims to determine the relationship between process skills and student learning outcomes in the Discovery Learning learning model for class XI biology material. This research is a type of quantitative research with the One Shot Case Study method. The subjects in this study were all students of class XI, totaling 14 students. Data collection techniques by observation, interviews, and questionnaires. The assessment instrument uses a questionnaire and multiple choice questions. While the data analysis with correlation test using SPSS. The average value of cognitive learning outcomes obtained through the application of discovery learning models assisted by LKS Media is 73.5714, which means that the average value obtained by students is in the good category. And the average value of the results of the student's process skills by applying the discovery learning model through YouTube media in the form of a practicum to make respiratory system props resulted in an average number of 83.3571 with a sample of 14 students of class XI MIA. The average value of learning outcomes on skills learning outcomes is 73.5714 < 82.3571, so it can be interpreted descriptively that there is a difference in the average learning outcomes with process skills. Based on the results of the calculation of the Normality, Homogeneity and Correlation test, it shows that there is a relationship between cognitive learning outcomes and the biological process skills of students in class XI MIA MA Nizhamiyah Ploso.*

***Keywords**: Learners; Discovery Learning; Proces Skills; Cognitive Learning Outcomes.*

## INTRODUCTION
Education is one of the efforts made by the government to improve human resources (HR). Along with this, various efforts have been made to improve the quality of education, one of which is by increasing learning activities. The education process as a whole is learning, with the teacher as the main role holder. The close relationship between education and learning activities, it can be said that the success of education is determined by the success of learning activities (Sati et al., 2017)

Salmi (2019) Stating that the success of learning objectives is determined by the teacher's factor in carrying out the teaching and learning process, because the teacher can directly influence, foster, and improve the intelligence and skills of students according to the learning model used by the teacher. learning model is one of the factors that influence success in the learning process. The selection of the right learning model will give satisfactory results (Zulfah & Mahmudi, 2021). The discovery learning model is a learning model that encourages students to ask questions and draw conclusions from general principles of practical experience. In the discovery learning model using a scientific approach, students carry out each step themselves with the guidance of the teacher. The application of the discovery learning model is in accordance with several Biology science learning materials, one of which is the respiratory system material (Roziqin, 2018). Learners will find out for themselves how to make respiratory system props through student worksheets (online worksheets) and youtube links as a guide sent via the whatsapp group. Students will practice independently at home on how to make good and correct teaching aids. Students are also expected to follow the steps of discovery learning that are very compatible with process skills. The results of other studies show that the discovery learning model can improve learning outcomes and science process skills (Sirojudin & Hariyanti, 2021).

The success of the learning process is not only seen from student learning outcomes but also in the process of learning. The learning process is inseparable from the activities of teachers and students.

Improving learning activities for both teachers and students means improvements in the learning process. Planting concepts from the start is very important to help the development of student knowledge so that learning can take place synergistically so that the goal of a learning is achieved, namely getting learning outcomes that at least meet the minimum completeness limit accompanied by a good learning process. The results of observations and interviews with Biology subject teachers at MA Nizhamiyah Ploso class XI MIA showed that: 1) The teacher had implemented the Discovery Learning model, but during online education it could not run well because the subject matter could not be delivered in its entirety. 2) The teacher is less able to explain the material in detail and for activities practice also can not be done optimally. 3) Students have never made props for the respiratory system. Seeing and reviewing the facts found in the field, it appears that there are problems in the classroom. Based on the description above, the authors conducted a study entitled " The correlation between processing skills and learning outcomes based on implementation discovery learning" This is consistent with the results of previous research which showed that learning Physics by applying the discovery learning model can improve learning outcomes and science process skills (Rasiningtias, 2016). The results of other studies also show that the discovery learning model has a significant influence on learning outcomes and science process skills (Susanti, et al. 2016).

## METHOD

This type of research is quantitative research. This method uses a pre-experimental design method, the form of design used in this research is a one-shot case study design.

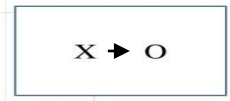


**Figure 1.** One-Shot Case Study Design
(Sati et al., 2017)

Based Figure 1, there is one group or using one class given treatment and then the results are observed. This design was done by comparing the results of process skills and cognitive learning outcomes in the group being tested. This location determination technique was carried out intentionally (purposive sampling area) in this study, the location determined by the researcher was MA Nizhamiyah Ploso. The population respondent determination technique used in this study was referring to the class XI MIA MA Nizhamiyah Ploso class student. Determined in class XI MIA as many as 14 samples using the discovery learning model. The method used by the author in this study is observation and interviews. The instruments used in this study were a questionnaire to analyze the needs of teachers and students, a learning implementation questionnaire, a learning outcomes test questionnaire and a process skills questionnaire. Data analysis using SPSS 25 application to calculate correlation.

Student learning outcomes are known through the results of cognitive learning analysis. The data is taken through the responses of students who work on online test questions collected through the google form, while the results of process skills are known through the results of the analysis of process skills collected through a questionnaire filled out by the researcher. The score for the assessment of test results can be calculated by this formula :

$$\text{Value of Learning outcome} = \frac{\text{Total score obtained}}{\text{Maximum score}} \text{ X } 100\ \%$$

**Table 1** Interpretation Scale of Learning Outcomes Criteria

| Interval | Criteria |
|---|---|
| 0 – 30 | Very less |
| 31 – 60 | Pretty good |
| 61 – 80 | Good |
| 81 – 100 | Very Good |

(Source : Visilia, 2015)

The score for the assessment of Process Skills results can be searched using the formula:

$$\text{Value of Processing Skill} = \frac{\text{Total score obtaine}}{\text{Skor maksimal}} \text{ X } 100\ \%$$

**Table 2** Interpretation Scale of Process Skills Criteria

| Interval | Criteria |
|---|---|
| <30 % | Very less |
| 31 – 60 | Pretty good |
| 61 – 80 | Good |
| 81 – 100 | Very Good |

(Source : Fatikasari et al., 2020)

To find out if there is a correlation or not then the assumptions are used as follows:
H0: no relationship between process skills and learning outcomes
H1: there is a relationship between process skills and learning outcomes
If the significance result < 0.05 then there is no relationship, If the significance value > 0.05, then there is a relationship. To calculate the correlation, the prerequisite test must be conducted, namely the test of normality and homogeneity. Test prerequisites and correlation tests using SPSS 25.

## RESULT AND DISCUSSION

### Result

Cognitive learning outcomes of students can be seen from the posttest scores.The posttest value is value after the application of the discovery learning learning model. Cognitive learning outcomes of students in this study were calculated individually (Sholihah, F., & Prihatiningtyas, 2021). Analysis of students' cognitive learning outcomes can be seen in Figure 2**.**

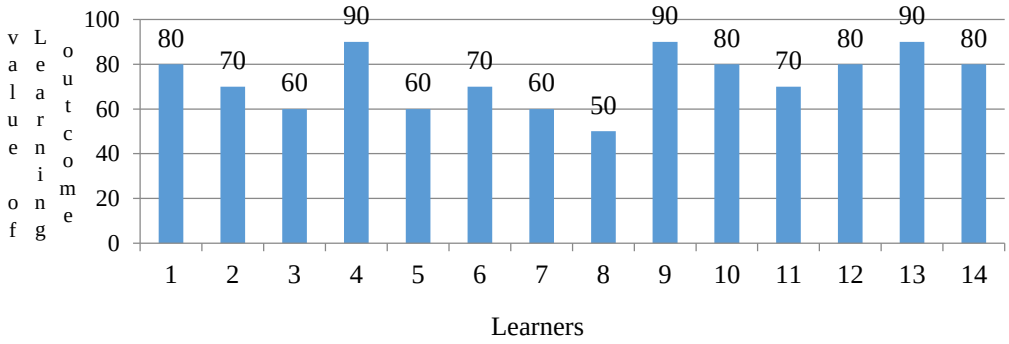


**Figure 2** Cognitive Learning Outcomes

The diagram above is the result of cognitive learning for the students of class XI MIA MA Nizhamiyah, totaling 14 students. The horizontal line in the diagram above shows the number of students while the vertical line shows the value of student learning outcomes. From the diagram, it can be seen that the number of students who scored 50 was 1 student, the value of 60 was 3 students, the value of 70 was 3 students, the value of 80 was 4 students and the value of 90 was 3 students. Based on the diagram of the value of learning outcomes above, it can be seen that after the discovery learning model is applied it can have a positive effect on improving students' cognitive learning outcomes in online learning (on the network).

**Table 3.** Summary of Statistical Results Using SPSS 25

| | | Statistic | Std. Error |
|---|---|---|---|
| Cognitive Learning Outcomes | Mean | 73,5714 | 3,41412 |
| | N | 14 | |
| | Std. Deviation | 12,77446 | |
| Process Skills | Mean | 82,3571 | 2,19792 |
| | N | 14 | |
| | Std. Deviation | 8,22386 | |

Munah Hartuti & Widyasari (2016) Stating that Statistics is a collection facts in the form of numbers arranged in the form of a list or table. While statistics are calculations or formulas used in processing the data, or can be interpreted as a set of quantitative data presented in the form of tables, graphs, symbols, or measures. The Table 3 above shows a summary of the statistical results of the two samples studied, namely cognitive learning outcomes and process skills. For the value of cognitive learning outcomes obtained with an average or mean of 73.5714, while the value of process skills obtained an average value of 82.3571. The number of respondents or students used as a sample is 14 students, for the Std. Deviation (standard deviation) on the value of learning outcomes is 12.77446 and process skills is 8.22386. Next Std. The mean error for the value of learning outcomes is 3.41412 and for the value of process skills is 2.17992.

The average value of learning outcomes on learning outcomes is 73.5714 < 82.3571 skills, so it can be interpreted descriptively that there is a difference in the average learning outcomes of students between cognitive learning outcomes and process skills. Furthermore, to prove whether the data is normal or not, it is necessary to present the results of the normality and homogeneity tests contained in the following table.

**Table 4.** Normality Test Results Using SPSS 25.0

| | | | |
|---|---|---|---|
| Cognitive Learning Outcomes | Statistic | Df | Sig. |
| | ,919 | 14 | ,210 |
| Process Skills | Statistic | Df | Sig. |
| | ,067 | 14 | ,051 |

Normality test using SPSS 25.0 with shapirow-wilk test. Wahidi & Nurcahya (2019) revealed that the normality test is declared normal if the significance is > 0.05. From the table of normality test results above, it is known that the significance value (Sig.) for cognitive learning outcomes is 0.210 and process skills is 0.051. Because the significance for both variables is greater than 0.05, it can be concluded that the population of data on cognitive learning outcomes and process skills is normal.

**Table 5.** Homogeneity Test Results

| | | Levene Statistic | Df 1 | Df 2 | Sig. |
|---|---|---|---|---|---|
| Homogeneity Test Results | Based On Mean | 4,269 | 1 | 26 | ,049 |
| | Based On Median | 4,173 | 1 | 26 | ,051 |
| | Based On Median and With Adjusted df | 4,173 | 1 | 24,702 | ,052 |
| | Based On Trimmed Mean | 4,214 | 1 | 26 | ,050 |

Homogeneity test is used to determine whether the research population have the same variance or not (Wulandari, 2018). In Table 5 is the homogeneity test aims to determine whether the data obtained are homogeneous or not. This homogeneity test uses Levene's test statistic by taking a significance level of 5%. The test criteria are as follows: a) If the significance value (sig) < 0.05, the data comes from a population that has a non-homogeneous variance. b) If the significance value (sig) 0.05, the data comes from a population that has a homogeneous variance (Widiyana, 2016). Based on the homogeneity test table above, it shows that based on mean has a sig value. = 0.049 < = 0.05 based on median has sig. 0.051 < 0.05 based on median on with adjust df has a sig value. 0.052 < 0.05 and based on trimmed mean has a sig value. 0.050 < 0.05. This shows that Ho is rejected, so it can be concluded that all data groups in the study have non-homogeneous variants.

**Table 6.** Correlation Test Results Using SPSS 25.0

| | | Process Skills | Cognitive Learning Outcomes |
|---|---|---|---|
| Cognitive Learning Outcomes | Person Corelation | 1 | -,284 |
| | Sig. (2 - tailed) | | ,325 |
| | N | 14 | 14 |
| Process Skills | Person Corelation | -,284 | 1 |
| | Sig. (2 - tailed) | ,325 | |
| | N | 14 | 14 |

Correlation analysis is used to determine the degree of close relationship between one variable and another variable (Sihombing & Bangun, 2019). Based on the calculation of the data, it is known that the results of the calculation of the correlation test on the variables of cognitive learning outcomes and process skills using the SPSS version 25.0 application, the results obtained are rcount 0.284. The results of the correlation test obtained that rcount was greater than = 0.05 or 0.284 > 0.05 with a Sig (2-tailed) value of 0.325 > 0.05. This paper can show that there is a relationship between learning outcomes and cognitive process skills of students in science subjects for class XI MIA MA Nizhamiyah Ploso. The relationship shows significance and is positive, which means that if the learning outcomes are good, the process skills are also good.

**Discussion**

Learning outcomes are the results obtained by students after the learning process is aimed at the value of the task or test questions given by the educator after each giving and delivering the subject matter (Widiyana, 2016). The results of the research described above, that students' process skills are related to student learning outcomes, are evident from several data on the results of process skills and improvement of learning outcomes. In this study, the aim of this study was to find a solution to the problems of online learning conducted by MA Nizhamiyah Ploso, namely by means of practicum for making respiratory system props carried out by students from their respective homes. the media used is through youtube with the aim of the researcher is to determine the process skills of students during online learning on student learning outcomes. The benefits of this research include: a. make it easier for teachers to train students' process skills, b. Make it easier for teachers to find out the relationship between process skills and cognitive learning outcomes. The benefit for researchers is that it can be a reference, source of information and reference material for further research so that it can be further developed in other materials to improve the quality of learning. The benefits for students themselves are being able to cultivate skills in utilizing the Youtube application as a means of delivering practicals, and having new experiences in the learning process. By using two instruments (practicum of the respiratory system and student worksheets) in analyzing process skills, it is necessary to understand the methods or learning models that train students' process skills, because the learning methods/models affect the acquisition of students' scores between the assessment of process skills and cognitive learning outcomes (Sholihah, F., & Prihatiningtyas, 2021)

In this case, Lestari & Diana (2018) has conducted previous research with the title Science Process Skills (KPS). In the implementation of the Basic Physics Practicum 1, data was produced in the sufficient category, but the indicators in applying the concept obtained the lowest score in the less category. So based on these results, the overall average of the results of this test is obtained with a percentage of 72% with a sufficient category. While in this study which discussed the respiratory system practicum to determine the process skills of students, the average result was 82.3571. So this research can be said to be quite good. The relationship shows significance and is positive, which means that if the learning outcomes are good, the process skills are also good (Fatikasari et al., 2020). In this case, the researchers hope that the results of the research conducted at MA Nizhamiyah Ploso in the form of practicum for making respiratory system props can be a reference for further researchers with models and media that are even more interesting and better than the research that has been carried out by researchers in this article. And the researchers hope that this research can be a solution for educators in conveying learning to students during this COVID-19 pandemic by developing YouTube media to find out and assess the value of students' process skills.

## CONCLUSION

The average value of cognitive learning outcomes obtained by MA students in class XI Nizhamiyah Ploso through the application of discovery learning models assisted by Student Worksheet Media is 73.5714, which means the average value obtained by students is in the good category. And the average value of the results of the process skills of MA class XI Nizhamiyah Ploso students by applying the discovery learning model with the help of YouTube in the form of practicum for making respiratory system props produced an average number of 83.3571 with the number of samples used, namely 14 students. class XI MIA. The average value of learning outcomes on learning outcomes is 73.5714 < 82.3571 skills, so it can be interpreted descriptively that there is a difference in the average learning outcomes of students between cognitive learning outcomes and process skills. Based on the results of the calculation of Normality, Homogeneity and correlation test, it shows that there is a relationship between cognitive learning outcomes and the process skills of Biology students of class XI MIA MA Nizhamiyah Ploso.

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