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## APPLICATION OF PROJECT BASED LEARNING LEARNING TO WRITE SCIENTIFIC ARTICLES (CASE STUDY OF UNJ-UNNES COLLABORATION CLASS)

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**Abstract:** *The purpose of the study identified the learning process of writing scientific articles based on Project Based Learning (PJBL). The research approach is quantitative with a survey method from an observation on the population and sample data into generally applicable conclusions for a large population using data collection instruments in the form of questionnaires. The results of observations and interviews of 6 (six) students (20%) stated that the learning used in learning to write scientific articles did not interest them in learning. In addition, 3 (three) students (10%) stated that lecturers have not consistently applied the learning process of writing scientific articles to trigger creativity, including 18 (eighteen) students (60%) explained about the lack of creation of Project-Based Learning based learning in the learning process of writing scientific articles. On the other hand, 3 (three) students (10%) confirmed that lecturers did not give direction to students. As a result, as the results of interviews, students have difficulty achieving learning outcomes. They do not understand well about the concept of writing scientific articles, and also the characteristics of scientific articles. The most important finding in the study of 150 students was about the statement "I am able to write scientific articles" produced with a frequency that stated very capable as many as 7 people or about 5%, who answered capable as many as 53 people or 35%, who answered less capable as many as 54 people or 36%, then those who answered less capable as many as 33 people or 22%, and who answered less capable as many as 1 person or 1%. This shows that students are less able to write scientific articles properly and correctly almost 36%. In the statement "I know the types and characteristics of scientific articles" produced a frequency that stated very good as many as 11 people or about 7%, who answered either as many as 51 people or 34%, who answered neutral or did not answer good or bad as many as 54 people or 36%, then those who answered less well as many as 28 people or 19%, and who answered less well as many as 3 people or 3%. In conclusion, students do not really know about the types and characteristics of scientific articles clearly. The conclusion of the research is that Project Based Learning (PJBL) is an effective educational approach that focuses on the relativity of thinking, problem solving, and interaction between students to obtain and use new knowledge in the process of writing scientific articles.*

**Keywords:** *Scientific Articles, Writing Skills, Project Based Learning (PJBL)*

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### INTRODUCTION

Writing is an essential activity in academic activities. Scientific writing skills can also help smooth completion of studies for students. Some universities in Indonesia require students to publish the results of their research to scientific journals both national and international journals. Of course, this is a challenge for students who need good knowledge and skills in writing scientific articles.

Good scientific articles are those that can raise new things (actual) and have never been written by others or themes that have been written by others but have not studied some elements that can be developed, this is called advanced research (Samanhudi & Linse, 2019). Knowledge and skills in writing scientific articles must certainly be understood by students. Skilled in writing scientific articles also serves for the benefit of other scientific activities, such as seminars, training, workshops, and the like.

But the reality on the ground has not shown the expected reality (Sinaga & Feranie, 2017). Still in large numbers students do not have adequate knowledge and skills in writing scientific articles. In fact, not a few students still lack knowledge and skills in terms of writing scientific articles (Kheryadi, 2016). This requires a reconstruction of the cognitive process of writing scientific articles on the students themselves Fadhly et al (2018) even Lustyantie (2017) suggested, collaborative learning can

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develop various knowledge and skills that can prepare students to understand the flow of writing good scientific journal articles, because there will be activities to exchange opinions between students.

This certainly needs to be an encouragement made by lecturers to their students through academic writing courses. The course aims to provide competencies for students to be able to express knowledge, insights, and ideas in the form of academic writing. Through the activity of writing scientific journal articles, it is hoped that students will be better at mastering academic writing skills. W.-C. V. Wu et al (2020) emphasized that writing is an intellectual work that must be developed in students. When writing, students are expected to have broad insights and ideas (W.-C. V. Wu et al., 2020; Ebron & Mabuan, 2021; Su Ping et al., 2020). These insights and ideas can be obtained from reading, observation, and discussion (Cumming et al., 2016). The content of the writing will characterize the author's ability in accordance with knowledge. Knowledge in scientific writing must be more intensified, so as not to be left far behind by other countries (Fadhly et al., 2018).

From the Scimago portal, it is known that Indonesia is ranked 40th, with the number of publications as many as 263491. Indonesia is still below from neighboring ASEAN countries, such as Malaysia which ranks 29th with the number of publications of scientific papers 410009, Singapore which is ranked 34th with the number of 373202 publications. If students in Indonesia are encouraged well, the publication ranking will jump even higher. In fact, students in Indonesia are still weak in the skills of writing scientific articles. Evidenced by the ability to write scientific articles of students whose results are not satisfactory. Student academic writing assignments such as papers, articles, and proposals have not shown actual, critical, and novelty ideas of research results. This happens in almost all universities in Indonesia.

This phenomenon is behind the importance of building awareness in students in writing scientific articles at the Faculty of Language and Arts, Faculty of Language and Arts, State University of Jakarta (UNJ) and Semarang State University (UNNES). The mastery of student article writing skills is still very minimal, evidenced by the results of observations and open interviews as many as 30 students who have compiled scientific articles. Observation and interviews to obtain data on the obstacles faced during learning and how the learning outcomes are achieved. All of these interviews indicate four fundamental problems in writing scientific articles.

Of the 30 (thirty) participants, as many as 6 (six) students (20%) stated that the learning used in learning did not interest them. In addition, 3 (three) students (10%) stated that lecturers have not consistently applied the learning process of writing scientific articles to trigger creativity, including 18 (eighteen) students (60%) explained about the lack of creation of Project-Based Learning based learning in the learning process of writing scientific articles. On the other hand, 3 (three) students (10%) confirmed that lecturers did not give direction to students. As a result, as the results of interviews, students have difficulty achieving learning outcomes. They do not understand well about the concept of writing scientific articles, and also the characteristics of scientific articles. In the more technical aspect, students also still have difficulty in understanding the concept of cohesion and coherence forming a sentence to paragraph.

Currently, of course, lecturers must make learning innovations that make it easier for students to understand learning to write scientific articles. therefore the learning system carried out on students in achieving course learning outcomes (CPMK) in order to be realized. Graduate Learning Outcomes (CPL) in the form of lectures in the form of face-to-face and/or blended learning, seminars, practicums, responses, research, studio practice, workshop practice, or field practice by applying a student active learning approach and learning models including Project Based Learning (PjBL), Case Based Learning (CBL), Problem Based Learning (PBL).

Various opinions say that Project Based Learning (PjBL) is one of the learning solutions that can be applied along with providing opportunities for students to design, plan, and conduct projects in the form of scientific articles. This study took several references to previous research. The following are some studies that become references. Writing scientific articles is a competency that must be

possessed by everyone who is involved in the world of education (Sinaga & Feranie, 2017; Baghbadorani & Roohani, 2014a). Next with a slightly different point of view Roessingh & Chambers (2011) It suggests that the essential elements in project design are, (1) an overview of the project with its rationalization, (2) a clear set of learning objectives and key concepts, (3) a list of materials and resources, (4) a possible set of tasks, and (5) assessment criteria and rubrics. By having these elements in project planning, it will be easier for the project team to design, execute, and evaluate the project successfully. In addition, these elements can also help ensure that the project goes according to plan and achieves the desired learning objectives (Mahanal et al., 2010; Dewi, 2021; Ardianti et al., 2017; Surya et al., 2018; Afriana, 2015). From all previous research described, to identify what happened in the learning process of writing scientific articles, research articles were compiled that focused on identifying the learning process of writing scientific articles based on *Project Based Learning* (PjBL).

### Writing Scientific Articles

Writing scientific articles in universities today is still a classic problem that must be solved. In general, the implementation of the use of various learning processes has been carried out for a long time, but its application is only limited to situational applications, even then it is carried out not optimally. This has resulted in learning to write scientific articles still facing various problems. These problems, for example, the learning process when carrying out learning is only oriented to the final result, not to the process of mastering the material. Lecturers more often provide lecture materials with the lecture method which results in a less developed independent learning system.

Understanding scientific articles according to Jatmiko et al (2015) is a paper designed to be published in a collection of articles or journals, written with scientific writing procedures that are adapted to applicable scientific conventions. Meanwhile, according to Brotowidjoyo (2002), the definition of scientific articles as part of scientific work is a scientific work that presents general facts and is written according to a good and correct writing methodology. Scientific articles can be original articles, mini reviews, reviews, and shortcommunication /notes/ comments. In general, a scientific article has a structure consisting of article titles, author names and email addresses, abstracts, introductions, materials, research methods, findings, discussions, conclusions, and bibliography / references (Soegianto, 2018).

The characteristics of Scientific Articles are as follows (1) Objective, meaning that the content of scientific articles can only be developed from conditions that actually exist, even though the existence of phenomena that are the focus of discussion differ from one field of science to another, (2) Rational, (3) Critical because it functions as a vehicle to convey mutual criticism of something in question., (4) Reserved (restraint, careful and not overclaiming), honest, straightforward and does not include personal motives and certain interests, (5) Scientific articles have a formal language style so that they only focus on science and there is no non-formal language style, (6) Citing sources with clear source identification (Damayanti, 2022; Ginting & Basyir, 2021; Susetyo et al., 2020).

Scientific articles that will be published in journals can be sourced from the results of research or study of a problem based on the results of appropriate/relevant thoughts and literature studies. Scientific articles based on research results generally consist of seven things, namely the title, preliminary abstract, research methods, research results and discussion, conclusions and bibliography. Meanwhile, articles sourced from the study of a problem based on the results of relevant thoughts and literature, the structure of the manuscript consists of six things, namely the title, abstract, introduction, discussion, conclusion, and bibliography (Hariyati, 2010).

Here is the structure of writing scientific articles:

- 1) The title of the article does not have to be the same as the title of the research report. Under the title is listed the name of the author without a title and the institution in which he serves.
- 2) Abstract contains the core of the problem / objectives, research methods, results and conclusions. Speak English or Indonesian. At the end of the abstract are written keywords (keywords).
- 3) The introduction contains the background of the problem (why the problem was researched, the formulation of the problem, literature review and information related to the writing. References are indicated by writing the author's name and the year of publication of the book. The theoretical

basis can be included in this section.

- 4) Research methods describe the ways of conducting research including research subjects, populations and samples, data collection, and data analysis techniques.
- 5) The results of the discussion research contain a description of the results obtained and then given a scientific discussion (explanation) based on certain references so that the problems raised can be solved. The results of the study were also compared with the relevant research results.
- 6) The conclusion contains a brief statement of the research results obtained in accordance with the problem formulation.
- 7) The bibliography only contains libraries used in the preparation of scientific articles. It does not need to be the same as the bibliography contained in the research report.

By following these guidelines, students can write scientific articles that are clear, informative, and understandable to scientific readers and other researchers (Darmalaksana, 2021; Kardipah, 2020; Ruhayati, 2019).

### **Project Based Learning (PjBL)**

Basically, Project Based Learning (PJBL) is a learning that has long been developed and is very familiar among educators who are student-centered learning-oriented, make students the center of learning activities, and give confidence to students to develop their own learning creativity through a project and is student-centered learning where through this project-based learning students are required to learn independent and active and stimulate students to overcome problems by involving a project in the learning process.

In the results of the analysis of several previous research journals, researchers found information about the theory of Project Based Learning. Project Based Learning (PJBL) is a learning that has been widely developed in developed countries such as the United States. If translated into Indonesian, Project Based Learning (PJBL) means project-based learning (Kardipah, 2020). Subsequently, the first theory was put forward by Wulandari & Jannah (2019) states that PjBL is learning that uses projects or activities as a medium. PJBL-based learning is a learning model that uses problems as a first step in collecting new knowledge based on their experience in real activities. In addition, this PjBL learning model can also help students find a place to pour their creative ideas into the projects they will create. Project-Based Learning starts with an important question to guide the project. There are several project implementation steps in the class as stated in the following table;

Tabel 1. Procedures Of Project Based Learning

<b>Project Stage</b>	<b>Activities</b>
Start: Project Planning	<ul style="list-style-type: none"> <li>• Develop a driving question</li> <li>• Plan assessment</li> <li>• Organize resources</li> <li>• Decide on grouping strategies</li> </ul>
Stage 1: Project Launch	<ul style="list-style-type: none"> <li>• Stimulate students' interest, enthusiasm, and concern</li> <li>• Establish high expectation</li> <li>• Clarify rules, procedures, products, timeline, and grading practices</li> </ul>
Stage 2: Guided Inquiry and Product Creation	<ul style="list-style-type: none"> <li>• Facilitate resource use</li> <li>• Help students define tasks and assess progress</li> <li>• Scaffold learning and working</li> <li>• Cultivate presentation skill</li> </ul>
Stage 3: Project Conclusion	<ul style="list-style-type: none"> <li>• Stage exhibition</li> <li>• Conduct assessment</li> <li>• Reflect on project learning and process</li> </ul>

With that in mind, more formal steps can be summarized as follows: (a) start with an essential question; (b) designing plans for the project, (c) creating schedules; (d) monitor students and project progress; (e) assess the results; and (f) evaluate experience. In this study adopted the procedure proposed by (Mergendoller & Thomas, 2000).

**MATERIALS AND METHODS**

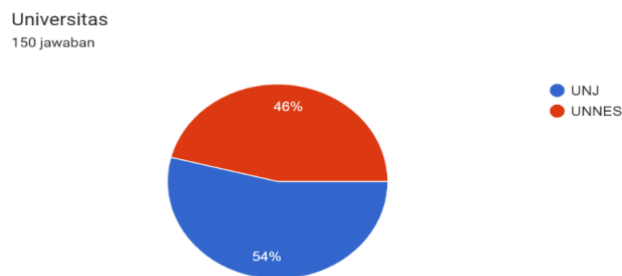
This research is a quantitative descriptive research, describing the state of the subject or object of research based on facts that appear or as they are. Descriptive research simply describes the research situation or event, does not seek or explain relationships, does not test hypotheses or make predictions. In addition, this study focuses on observation and natural atmosphere. The researcher acts only as an observer, simply creating behavioral categories, observing symptoms and recording in his observation book (Lustyantie, 2023).

**RESULTS AND DISCUSSION**

The results of the study were obtained from questionnaires using google forms, from the results of the data collection obtained respondents as many as 150 people. The data obtained has been verified beforehand to discard and eliminate invalid data that will later affect the results of the analysis of research data. The profile of respondents in this study was observed to give an idea of what the sample of this study looked like. The target respondents in this study are students of Jakarta State University (UNJ) and Semarang State University (UNNES).

The results of the questionnaire were 81 people (54%) respondents of UNJ students, and 69 people (46%) respondents of UNNES students. By looking at the percentage of respondents who participated in filling out the form, it can be seen that respondents from UNJ were slightly more involved in this study compared to UNNES student respondents with a difference of only 12 people or 8% of respondents. However, this percentage with a number that is not too far away shows that the composition of UNJ and UNNES student respondents is balanced.

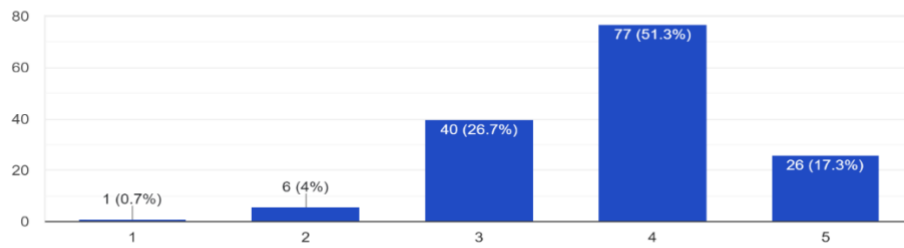
Based on the results of the research conducted, score data or scores were obtained from the questions in the questionnaire. Found using the output of descriptive statistical calculations through answers from questionnaires or questionnaires distributed via google form, has an average value of 60.76666667 or rounded to 60.8, has a median value of 62, and a mode value of 64. This value means that the closer the mean, median, and mode values, the normal distribution data will be.



Statistics	Value
Mean	60.76666667
Median	62
Mode	64

Based on the calculation of the statement "I know the learning objectives of writing scientific articles" produced a frequency that stated very well as many as 26 people or about 17%, who answered either as many as 77 people or with a percentage of 51.3%, who answered neutral or did not answer good or bad as many as 40 people or 27%, then those who answered less well as many as 6 people or 4%, and those who answered less well as much as 1 person or 1%. It can be concluded that students know about the learning objectives of scientific articles well although not in detail.

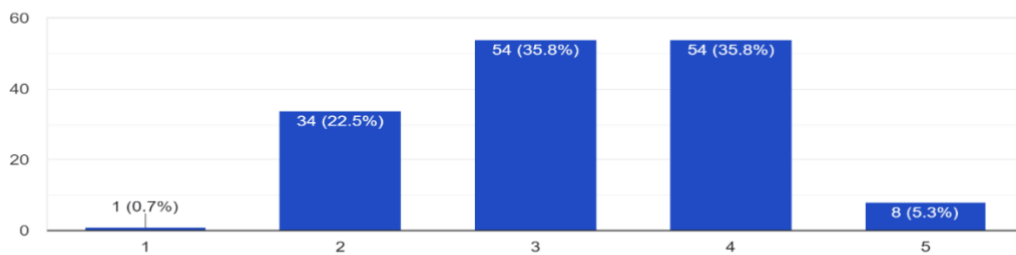
Saya mengetahui tujuan pembelajaran menulis artikel ilmiah  
150 responses



Then in the calculation of the statement "I know the criteria for writing good and correct scientific articles", the resulting frequency that states very good as many as 12 people or about 8%, who answer either as many as 55 people or with a percentage of 37%, who answer neutral or not answer good or bad as many as 53 people or 35%, then those who answer less well as many as 21 people or 14%, and those who answered less well as many as 5 people or 3%. It can be concluded that students know about how the criteria for writing scientific articles but with a general description, not too deep.

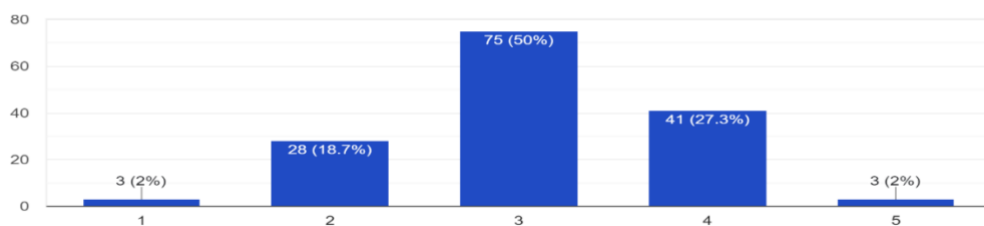
According to the calculation of the statement "I am able to write scientific articles" produced a frequency that states very capable as many as 7 people or about 5%, who answer capable as many as 53 people or 35%, who answer neutral or not answer good or less able as many as 54 people or 36%, then who answer less well as many as 33 people or 22%, and who answer less capable as many as 1 person or 1%.

Saya mampu menulis artikel ilmiah  
151 responses



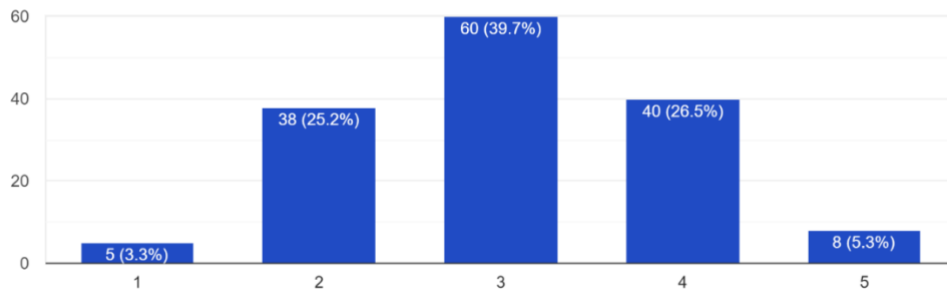
Based on the calculation of the statement "I have difficulty writing on the Abstract aspect" produced a frequency that states very good as many as 3 people or about 2%, who answer either as many as 41 people or 27%, who answer neutral or not answer good or bad as many as 72 people or 48%, then who answer less well as many as 28 people or 19%, and those who answered less well as many as 3 people or 2%. It can be concluded that students are able to make abstracts of scientific articles but with ordinary knowledge and not too focused (Wulandari & Jannah, 2019).

Saya mengalami kesulitan menulis pada aspek Abstrak  
150 responses



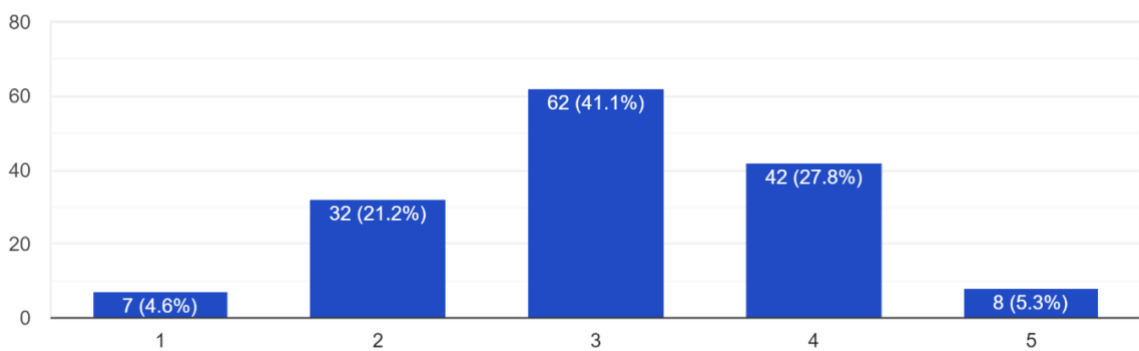
Furthermore, the calculation in the statement "I have difficulty writing on the Introduction aspect (Background, Phenomenon, Research Gap/State of the Art (SoTA) and Novelty / Novelty of scientific articles)" produced a frequency that stated very good as many as 8 people or about 5%, who answered either as many as 40 people or 27%, who answered neutral or did not answer good or bad as many as 58 people or 39%, Then those who answered less well as many as 36 people or 2%, and those who answered less well as many as 5 people or 3%. In conclusion, students are able to write introductory aspects in scientific articles (Wulandari & Jannah, 2019).

Saya mengalami kesulitan menulis pada aspek Pendahuluan (Latar belakang, Fenomena, Gap penelitian/State of The Art (SoTA) dan Kebaruan/Novelty artikel ilmiah  
151 responses



Based on the calculation of the statement "I have difficulty writing on aspects of Literature Review." the resulting frequency that states very good as many as 8 people or about 28%, who answer either as many as 42 people or with a percentage of 40%, who answer neutral or not answer good or bad as much as 60 people or 40%, then who answer less well as many as 30 people or 20%, and those who answered less well as many as 7 people or 5%. It can be concluded that students can make a general literature review.

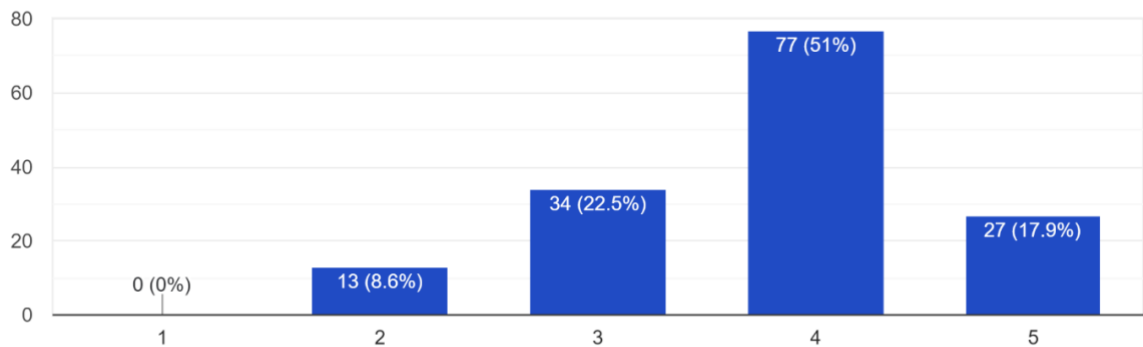
Saya mengalami kesulitan menulis pada aspek Kajian Pustaka (Literature Review).  
151 responses



In the calculation of the statement "I know the purpose of relevant articles of research results that have been published in national and international journals in the process of writing scientific articles" produced a frequency that states very good as many as 26 people or about 17%, who answered either as many as 76 people or 51%, who answered neutral or did not answer good or bad as many as 3 people or 27%3, Then those who answered less well as many as 13 people or 9%, and those who answered less well as many as 0 people or 0%. It can be concluded that students know well about the publication of scientific articles.

Saya mengetahui tujuan artikel relevan hasil penelitian yang telah dipublikasi pada jurnal nasional dan internasional pada proses penulisan artikel ilmiah

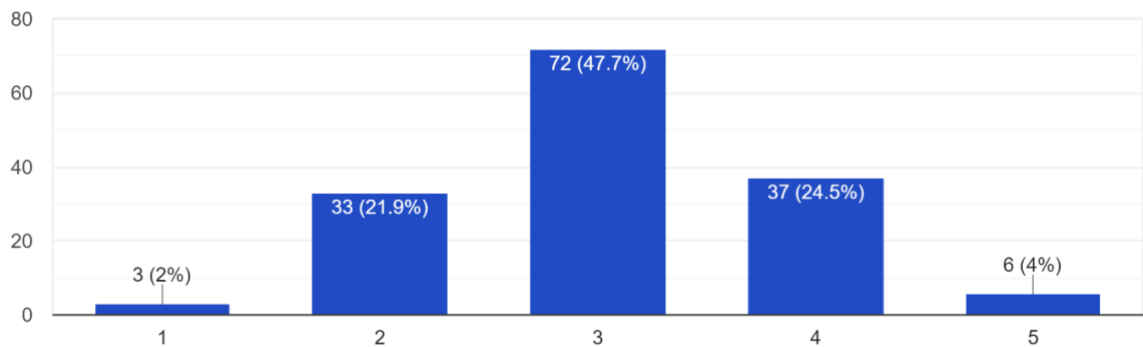
151 responses



Based on the calculation of the statement "I have difficulty writing on aspects of Methodology" produced a frequency that states very good as many as 6 people or about 4%, who answered either as many as 37 people or 25%, who answered neutral or not answered good or bad as many as 69 people or 46%, then those who answered less well as many as 32 people or 21%, and those who answered less well as many as 3 people or 2%. It can be concluded that students still lack understanding of how to make aspects of methodology.

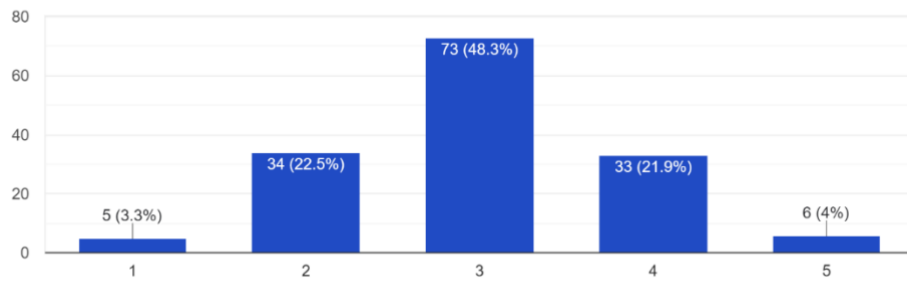
Saya mengalami kesulitan menulis pada aspek Metodologi

151 responses



According to the calculation of the statement "I have difficulty writing on aspects of research results, conclusions, and discussions" produced a frequency that stated very good as many as 6 people or 4%, who answered either as many as 33 people or 22%, who answered neutral or did not answer good or bad as many as 570 people or 47%, then those who answered less well as many as 33 people or 22%, and those who answered less well as many as 5 people or 3%. In conclusion, some students are able to write aspects of research results, conclusions, and discussions and some have difficulties.

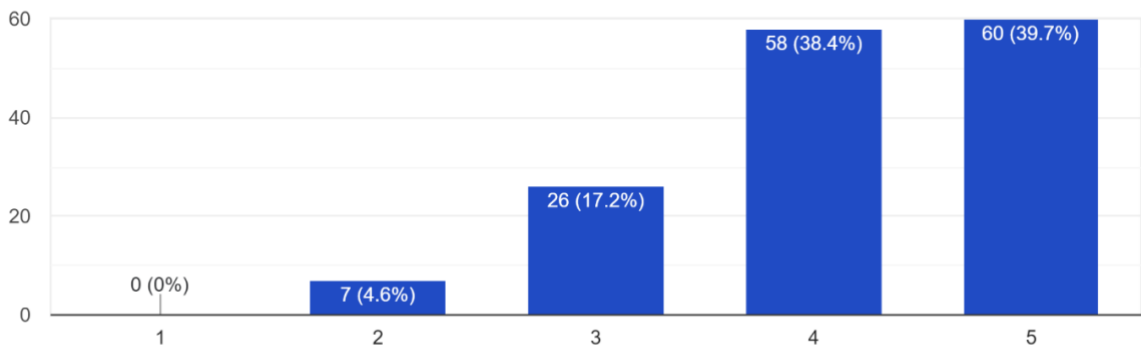
Saya mengalami kesulitan menulis pada aspek Hasil penelitian, kesimpulan dan pembahasan  
151 responses



Based on the calculation of the statement "Internal factors such as motivation, attitude, learning style, affect the skill of writing scientific articles", the frequency of stating very good as many as 59 people or 39%, who answered either as many as 58 people or 39%, who answered neutral or did not answer well or less well as many as 26 people or 17%, then those who answered less well as many as 7 people or 5%, and those who answered less well as 0 people or 0%. In conclusion, internal factors in students have a great impact on the ability to write scientific articles (Jampel, 2016).

Faktor internal seperti motivasi, sikap, gaya belajar, mempengaruhi keterampilan menulis artikel ilmiah

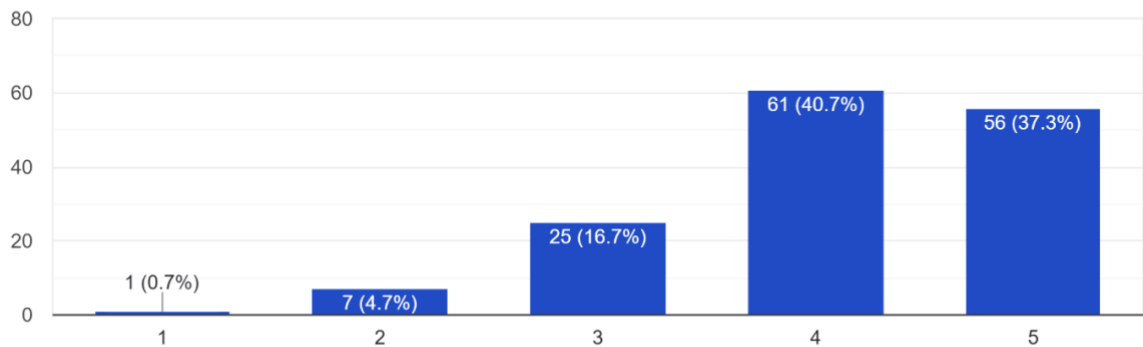
151 responses



Based on the calculation of the statement "External factors such as learning environment, learning strategies / methods, learning resources, teaching style, affect the skills of writing scientific articles", a frequency of very good states was produced as many as 55 people or around 37%, who answered either as many as 61 people or 41%, who answered neutral or did not answer well or poorly as many as 25 people or 17%, Then those who answered less well as many as 7 people or 5%, and those who answered less well as many as 1 person or 1%. It can be concluded that students agree that external factors also affect skills in writing scientific articles.

Faktor eksternal seperti lingkungan belajar, strategi/metode pembelajaran, sumber belajar, gaya mengajar, mempengaruhi keterampilan menulis artikel ilmiah

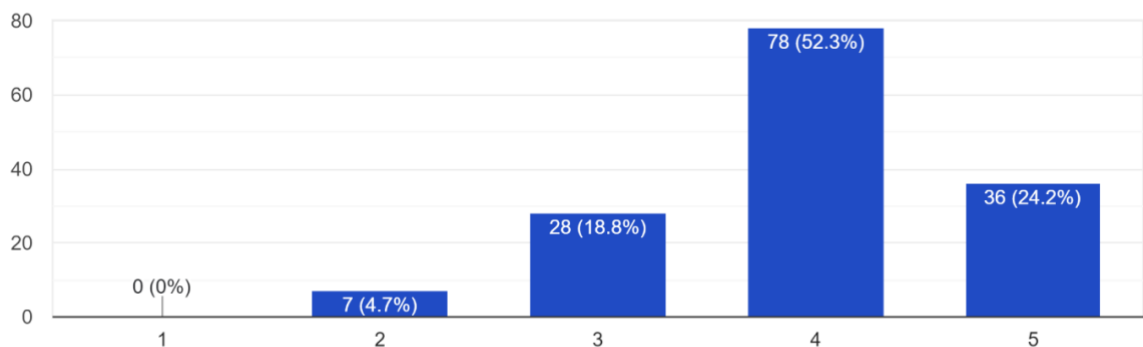
150 responses



Based on the calculation of the statement "Project Based Learning (PjBL) learning model is needed in learning to write scientific articles", the frequency of stating very good as many as 35 people or 23%, who answered either as many as 78 people or 52%, who answered neutral or did not answer good or bad as many as 28 people or 19%, then those who answered less well as many as 7 people or 5%, and those who answered less well as 0 people or 0%. In conclusion, for PjBL students, it is needed to help understand more about scientific articles (Hutapea & Simanjuntak, 2017).

Model pembelajaran Project Based Learning (PjBL) dibutuhkan dalam pembelajaran menulis artikel ilmiah

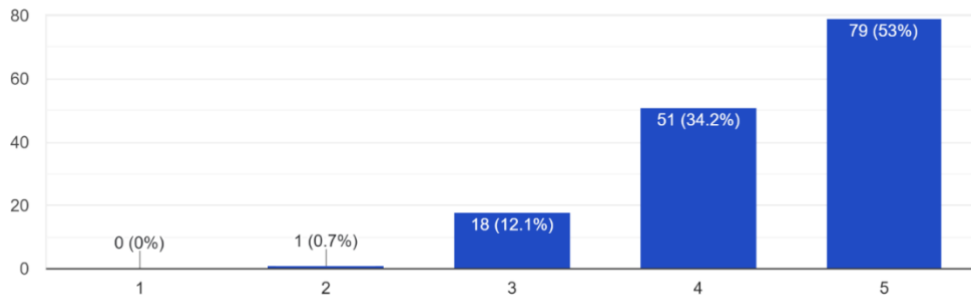
149 responses



For the calculation of the statement "Interaction between lecturers-students in the form of providing positive feedback is needed in learning to write scientific articles", a frequency of 78 people or about 52% was produced, who answered either 51 people or 34%, who answered neutral or did not answer well or less well as many as 18 people or 12%, then those who answered less well as much as 1 person or 1%, and those who answered less well as 0 people or 0%. It can be concluded that providing good feedback from lecturers can help increase students' desire to study scientific articles in depth.

Interaksi antara dosen-mahasiswa dalam bentuk pemberian feedback yang positif sangat dibutuhkan dalam pembelajaran menulis artikel ilmiah

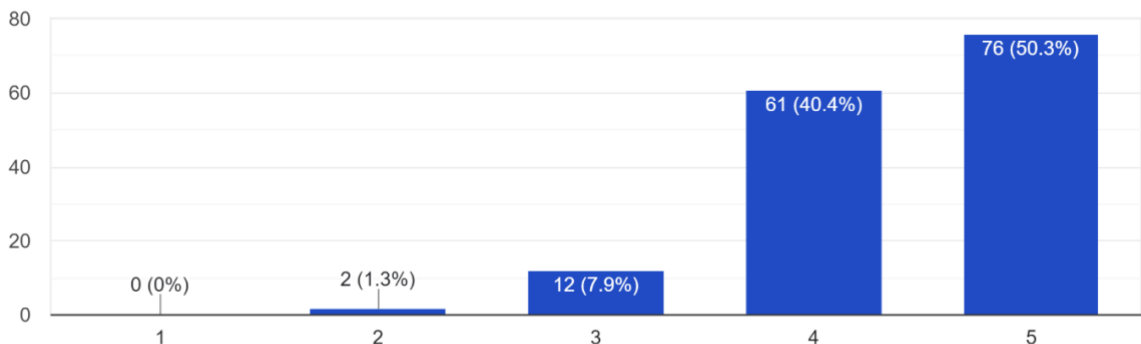
149 responses



Then, based on calculations on the statement "Good interaction and cooperation among students are needed in learning to write scientific articles." generated frequencies that stated very good as many as 75 people or 50%, who answered either as many as 61 people or 41%, who answered neutral or did not answer good or bad as many as 12 people or 8%, then those who answered less well as many as 2 people or 1%, and those who answered less well as 0 people or 0%.

Interaksi dan kerjasama yang baik diantara mahasiswa sangat dibutuhkan dalam pembelajaran menulis artikel ilmiah.

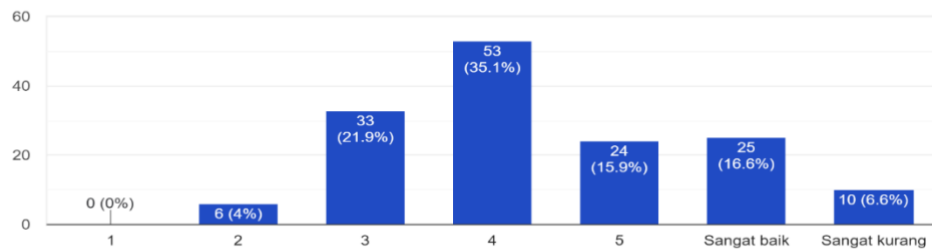
151 responses



Based on the calculation of the statement "One of the learning media needed in learning to write scientific articles is the Learning Management System (LMS)", the frequency that states very good as many as 48 people or about 32%, who answered either as many as 53 people or 35%, who answered neutral or did not answer good or bad as many as 33 people or 22%, then those who answered less well as many people or 4%, and those who answered less well as many as 8 people or 5%. It can be concluded that the holding of a platform for writing scientific articles can help students to create scientific articles and do direct practice on the platform.

Salah satu media pembelajaran yang diperlukan pada pembelajaran menulis artikel ilmiah adalah Learning Management System (LMS)

151 responses



## CONCLUSION

Students have not been able to write scientific articles properly and correctly so good cooperation between students is needed to be able to arouse interest in learning scientific articles by asking each other questions so that students can understand each other better about scientific articles, therefore Project Based Learning (PjBL) certainly gives students the opportunity to develop their potential and learning experience. PjBL learning is a learning that has long been known in the world of education even though its application has not been optimal. The selection of PjBL is applied in learning writing skills because learning this skill demands student creativity. Student creativity can emerge and apply if students are given freedom and trust in creation. One way is to give them a project, in this case an output project in the form of a scientific article.

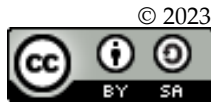
One of the main challenges facing higher education is to ensure holistic development of students both in terms of achievement of common attributes and development of competencies, namely creativity, thinking, teamwork, communication and collaboration, independence. To address these challenges, the transformation of new technologies in education has led to the use of additional teaching tools, such as project-based learning (PjBL).

The ability to write scientific articles of students is something that must be mastered and improved. This is because scientific articles are mandatory writings to be compiled as graduation requirements in Indonesia in accordance with the policies of each campus. The ability of students to write scientific articles also determines the possibility of scientific articles being published in a scientific journal. The better the ability of students in compiling scientific articles based on Project Based Learning, the better the scientific work produced, so the greater the chance of the article to pass the scientific publication.

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