

Utilization of Scientific Articles to Improve Learning Quality in Research Methods Courses

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Abstract: The purpose of this study was to determine the increase in learning outcomes of Research Methods students at the Faculty of Engineering, Civil Engineering Study Program, Graha Nusantara University Padangsidempuan through the application of scientific article learning and to find out the perceptions and involvement of students in learning scientific articles used, especially the Research Result Report material. This research is important to do to improve the learning quality of the Research Methods course so that students can easily learn it. The research method is an experimental method with a one-group pretest-posttest research design because not all experimental characteristics and conditions can be regulated and controlled strictly as in other experimental research. Research instruments in the form of tests and questionnaires. Learning outcomes data were analyzed with the Wilcoxon and N-Gain tests. While the perceptions and involvement of students were analyzed with a Likert scale. The results showed that scientific articles increased student learning outcomes when learning Research Methods by 33.58%. Perception and involvement of students in learning with scientific articles obtained positive results. This can be seen from the average student scores in the perception and student involvement questionnaire, both of which are in the medium category. The results of this study show the effectiveness of learning scientific articles in the Research Methods course which shows that the level of success achieved from learning scientific articles is in accordance with the planned learning objectives.

Keywords: Scientific Articles, Research Methods, Learning Outcomes, Student's Perceptions, Involvement, Educational Research

INTRODUCTION

Technological developments in the world of education play an important role in realizing national development. Through education, the formation and improvement of the quality of human resources can be carried out for the sake of forming a next generation that will build the nation and state in a better direction (Karim, 2017). The formation of the next generation that builds the nation in a better direction is marked by the development of religious, honest, responsible, tolerant and disciplined characters in learning which can support the success of teaching and learning activities at the elementary school level to tertiary institutions (Annisa & Dewi, 2022). The success of teaching and learning activities in tertiary institutions is not only determined by the lecturers, but also influenced by the activeness of students. Students are required to be responsible and more independent, where the lecturer only provides stimulation in the form of basic knowledge according to the substance of science. Lecturers act as facilitators, dynamists and motivators in the learning process. Students must find their own way of absorbing the material delivered by the lecturer to gain a comprehensive understanding and broad insight into knowledge. Therefore, students are required to find as many learning resources as possible (Setiyani, 2010).

Learning resources function as channels of communication and interaction between lecturers and students in a learning activity. Therefore, lecturers must develop and design learning resources systematically based on the needs of the learning activities to be carried out and the characteristics of the students who will participate in these learning activities (Nur, 2012). One of the subjects that requires a lot of learning resources is Research Methods. The research method is one of the subjects that must be taken by sixth semester students of the Civil Engineering Study Program, Faculty of Engineering, Graha Nusantara University Padangsidempuan. This course is a course that studies how to conduct research in order to obtain valid, authentic data and can be justified for its truth. This course also teaches how to carry out research in stages (Indonesia, 2021).

The problem that occurs in learning Research Methods is that students are unable to think comprehensively in understanding the material presented by lecturers so that they have difficulty understanding the material as a whole (Imron et al., 2022). This of course makes student Research Methods learning outcomes low and not as expected. Based on the results of the researchers' initial observations by asking for data on the final grades of Civil Engineering students in semester VI (Sixth) in the previous year, it was found that Civil Engineering students in semester VI (Sixth) who passed the Research Methods course were only 12 out of 30 students (40%). Where students are declared to have passed the Research Methods course if they get a score of ≥ 60 . Through this fact, researchers are trying to provide solutions to improve the quality of Research Methods learning by increasing student learning outcomes. Therefore, a learning strategy is needed that can improve the quality of Research Methods learning at the Faculty of Engineering, Graha Nusantara University Padangsidempuan so that student learning outcomes are increasing compared to before.

One of the efforts made to improve the quality of Research Methods learning at the Faculty of Engineering, Graha Nusantara University Padangsidempuan is through the use of scientific articles as a learning resource. Scientific articles are an effective learning resource for creating an independent learning process, especially at the tertiary level. As a forum for all creative-innovative aspirations and ideas, the use of scientific articles is not only the main barometer of the government's performance achievements in the field of empowering education through research activities, service and development of educational staff, but also a strategic medium in socializing scientific knowledge that is accountable (accountable knowledge share) and motivation which led to the birth of new and strategic scientific concepts for education at the education unit level (Arifin et al., 2020). So, learning through scientific articles will challenge students in studying Research Methods courses.

Scientific articles in the world of higher education function as a medium of information and communication regarding materials, references and even scientific research journals needed by the academic community to support their academic activities. With the existence of scientific articles, it will enable rapid scientific dialectic and updating of knowledge to occur intensively (Mustati & Najib, 2013). The information contained in scientific articles is information needed in conducting research, so students must be more active in utilizing scientific articles as references in studying research methods (Azwar & Amaliah, 2017).

Thus, scientific articles are one of the primary learning resources which contain new knowledge obtained through scientific research and sources of up-to-date information about the concepts studied by students (Syahmani & Sanjaya, 2021). Therefore, the authors are interested in conducting this research with the aim of determining the increase in learning outcomes of Research Methods students at the Faculty of Engineering, Civil Engineering Study Program, Graha Nusantara University Padangsidempuan through the application of learning scientific articles. In addition, it is also to find out the perceptions and involvement of students in learning the scientific articles used, especially the Research Results Report material which is the basis for students in conducting research from start to finish.

Previously, researchers used scientific articles to teach Basic Chemistry to 30 students of the Physics Education Study Program, Graha Nusantara University, Padangsidempuan. The results showed that the use of scientific articles in Basic Chemistry learning was able to increase student learning outcomes by 33.58%. Meanwhile, students' perceptions and involvement in the use of scientific articles in Basic Chemistry learning are in the medium category with an average value of

3.60 \pm 1.12 and 3.87 \pm 1.11 respectively (Pohan & Rambe, 2022). This research is the basis or guideline for researchers to conduct research on the use of scientific articles to improve the quality of Research Methods learning. It is hoped that the results of this research can later be used as a reference for lecturers who teach Research Methods courses to develop scientific articles as relevant learning resources.

METHOD

The method in this study is an experimental method with a One Group Pretest-Posttest Research Design research design that combines pre-test and post-test in a group before and after learning with scientific articles. The pre-test is carried out before the application of learning with scientific articles while the post-test is carried out after learning with scientific articles is applied (Fitrianiingsih & Musdalifah, 2015). The selection of the One Group Pretest-Posttest Research Design research design is based on the fact that not all experimental characteristics and conditions can be regulated and controlled strictly as in other experimental studies. In this study, researchers found out the difference between the learning outcomes of Research Methods using scientific article learning and the learning outcomes of Research Methods before implementing scientific article learning. Differences in learning outcomes in Research Methods learning outcomes obtained are considered as a result of the application of learning scientific articles in Research Methods courses, as well as the symptoms to be studied are intentionally caused (Maharani et al., 2019). The research subjects were 30 sixth semester students of Civil Engineering, Faculty of Engineering, Universitas Graha Nusantara Padangsidempuan who took the Research Methods course. The research was conducted six times face-to-face and once in the pre-test and post-test before the planned lectures.

The learning method used is group discussion, supplemented by direct learning and independent assignments. Group discussion is a form of learning activity that involves 3-9 students, takes place in an informal face-to-face situation which means that each member can communicate directly with other members, has goals to be achieved by cooperation between members and takes place according to a systematic process. The group discussion method is a way that can be pursued to increase cooperation between students, mutual assistance, mutual understanding by giving a problem to discuss. In these activities, students can exchange experiences, exchange information, so that all students can be active in learning. In other words, group discussions are a way of presenting courses in which students are faced with a problem which can be in the form of a statement or question that is problematic to discuss and solve together (Ratnadi, 2019).

Direct learning is learning that aims to help teach students basic skills gradually. This method can help students learn basic skills and obtain information that can be taught in stages because it is specifically designed to support student learning processes related to well-structured procedural knowledge and declarative knowledge (Arnika & Kusriani, 2014). Independent assignments are assignments given by lecturers to students to be completed within a certain period of time and equipped with a study contract. The time for completing independent assignments is an agreement between the lecturer and the student concerned. Independent assignments will also be evaluated in the process by students (Supriatna & Indah, 2021). In this research, learning begins with a preliminary test on the research topic. This lecture teaches theoretical topics in accordance with the Semester Learning Plan (SLP) for the Research Methods course. Students in the learning process must find and analyze scientific articles on lecture topics. As an independent task, each student is given the task of tracing scientific articles, comparing answers in groups and commenting on each other. This phase will be carried out outside of face-to-face lectures (Syahmani & Sanjaya, 2021).

The research instruments are tests and questionnaires. The test is in the form of multiple-choice questions that are in accordance with the material of the Research Results Report as many as 20 questions. Meanwhile, a questionnaire is a set of written statements provided and made based on a theoretical basis or research variables by researchers for respondents to answer (Harisyah & Azwar, 2015). The data obtained in this study is the learning outcomes data obtained before and after learning. In addition, data from the perception questionnaire and student involvement in

learning with scientific articles. The validity of the test is determined by testing the validity, reliability, distinguishing power and level of difficulty (Pohan, 2020).

On the other hand, the validity of the perception questionnaire and student involvement in learning with scientific articles was tested by three reviewers with an average reliability score of 0.81 (Cicuto et al., 2019). Pre-test and post-test learning outcomes data were analyzed using the Wilcoxon difference test to determine whether there was a significant difference between the pre-test and post-test results. The p-value obtained confirms the level of significance (Syahmani & Sanjaya, 2021). Student learning outcomes can also be seen from the gain index values obtained from the pre-test and post-test. The gain index is the amount of improvement achieved by the subject as a result of the learning done. The gain index value can be obtained by equation (1) below.

$$N\text{-gain} = \frac{\text{post-test score} - \text{pre-test score}}{\text{maximum score} - \text{pre-test score}} \quad (\text{Janah et al., 2019}) \dots (1)$$

Descriptions: N-gain = index of increasing learning outcomes; Post-test score = average score of students' Research Methods learning outcomes after applying scientific article learning; Pre-test score = average score of students' Research Methods learning outcomes before implementing scientific article learning; Maximum score = the highest score obtained by students during the pre-test and post-test

Equation (1) explains that the N-gain is obtained by calculating the difference between the pre-test average score and the post-test average score obtained by students and comparing it to the difference between the highest score obtained and the pre-test average value. The interpretation of the results of increasing the gain index can be found in Table 1.

Table 1. N-gain Category

Gain Index	Category
$g \geq 0.70$	High
$0.30 < g < 0.70$	Medium
$g < 0.30$	Low

Jusmawati et al. (2020)

Based on Table 1 above, it can be explained that the increase in student learning outcomes is categorized as high if the gain index is obtained ≥ 0.70 ($\geq 70\%$), while if the gain index is > 0.30 ($> 30\%$) and < 0.70 ($< 70\%$) and low if the gain index is < 0.30 ($< 30\%$).

Students' perceptions of the learning strategies applied and the results of student involvement with these strategies were analyzed using a Likert scale which has a range from very positive to very negative. For example: strongly agree with a score of 5, agree with a score of 4, disagree with a score of 3, disagree with a score of 2 and strongly disagree with a score of 1 (Harisyah & Azwar, 2015). The reason for choosing the Likert scale to analyze the perception questionnaire and student involvement is because this scale is suitable for measuring attitudes, opinions and perceptions of a person or group of people about phenomena that occur or are being studied. Thus, the use of a Likert scale will provide an overview of student perceptions of the learning strategies applied and student engagement with these strategies (Setiawan et al., 2022). The questionnaire has the components shown in Table 2.

Based on Table 2, it can be seen that in the questionnaire on student perceptions of learning strategies there are 5 categories to be filled in, namely: learning activities that have been carried out 11 statements, scientific articles as learning resources 7 statements, skills development 7 statements, understanding of scientific concepts 7 statements and evaluation of the learning process 7 statements. Thus, in the student perception questionnaire on learning strategies, students will fill in 39 statements based on their respective perceptions.

Table 2. Questionnaire Categories of Student Perceptions and Involvement

Questionnaire	Category	Number of Statements	Statements Num
Student perceptions of learning strategies	Learning activities that have been carried out	11	1-11
	Scientific articles as learning resources	7	12-18
	Skills development	7	19-25
	Understanding of scientific concepts	7	26-32
	Evaluation of the learning process	7	33-39
Student commitments of learning activities	Directed learning	7	1-7
	Discussion group	6	8-13

For the questionnaire on student commitment or involvement in learning activities, there are 2 categories to be filled in, namely: directed learning 7 statements and discussion groups 6 statements. So that in the questionnaire on student commitment or involvement in learning activities students fill out 13 statements. The questionnaire on student perceptions of learning strategies and student involvement in learning activities consists of 52 statements, each of which must be filled in by each student on a scale of 1-5. Student questionnaire calculations for each category are calculated using the following formula.

$$\text{Average value} = \frac{\text{Total score}}{\text{Number of items}} \quad (\text{Syahmani \& Sanjaya, 2021}) \dots (2)$$

Descriptions: Total score = total number of questionnaires (1-5) in all categories; Number of items = total number of statements filled out in the questionnaire (in this case 52 statements).

Equation (2) explains that the average score obtained by each student who fills in the questionnaire is the ratio between the total number of questionnaires filled out by these students in all categories to the total number of statements filled out by students in the questionnaire.

The ranking of the questionnaire according to the reference of student perception and involvement is shown in Table 3.

Table 3. Perception and Involvement’s Reference

Gain index	Category
$g \geq 4$	High
$2 < g < 4$	Medium
$g < 2$	Low

Based on Table 3 above, it can be explained that the ranking of the questionnaire in accordance with the reference of student perception and involvement is indicated by the average value of filling out the questionnaire or the gain index (g) obtained and categorized as high if the gain index obtained ≥ 4 , while if the gain index obtained is obtained > 2 and < 4 and low if the gain index obtained is < 2 (Taluke et al., 2019).

RESULTS

Analysis of Learning Outcomes of Research Methods Before and After Using Scientific Articles

The average learning outcomes of Research Methods students of the Civil Engineering Study Program, Faculty of Engineering, Graha Nusantara University Padangsidempuan before and after applying learning from scientific articles are shown in [Table 4](#) below.

Table 4. Average Value of *Pre-Test* and *Post-Test*

Data	M	SD	Mean difference in pre-test and post-test scores	The SD of the difference in pre-test and post-test scores	N
Pre-test result	62.17	8.78	7.67	2.82	30
Post-test result	69.83	9.42			30

From [Table 4](#) above it can be seen that the average student Research Method learning outcomes before using scientific articles was 62.17 ± 8.78 . While the average learning outcomes of Research Methods students after using scientific articles is 69.83 ± 9.42 . The mean difference between the pre-test and post-test scores was 7.67 ± 2.82 . This shows that the use of scientific articles improves student learning outcomes when learning Research Methods. This means that the use of scientific articles affects the learning outcomes of student Research Methods.

The Wilcoxon test was used to test the effect of using scientific articles on student Research Methods learning outcomes in the Research Results Report material ([Nuryadi et al., 2017](#)). The use of scientific articles is a very appropriate and effective learning technique in the learning process, because it is believed that the optimization of student learning outcomes is influenced by the learning conditions created by the lecturers in the class. The more appropriate the learning strategy applied by the lecturer to the differences in student characteristics, the better the student learning outcomes. By using this scientific article to teach material related to Research Results Reports, higher Research Methods learning outcomes can be expected. Therefore, the use of scientific articles can optimally improve student learning outcomes in the Research Methods course. Testing is carried out with the following hypotheses:

Ho: "The use of scientific articles does not have a significant effect on Method learning outcomes Student research on research report material.

Ha: "The use of scientific articles has a significant effect on Method learning outcomes Student research on research report material" ([Pohan, 2017](#)).

The results of the Wilcoxon test for improving learning outcomes in Research Methods show a pre-test and post-test probability value of 0.005. This probability value is below the significance value of $p < 0.05$. In addition, it was found that Z_{count} is 1.7668 and Z_{table} at $\alpha = 0.05$ is 0.9945. Ho is rejected and Ha is accepted if $Z_{count} > Z_{table}$ ([Ananda & Fadhi, 2018](#)). Therefore, the use of scientific articles as a learning resource can have a significant effect on improving student learning outcomes in learning Research Methods. This means that the results of studying Research Methods students who use scientific articles will be different from students who do not use scientific articles. The results of this hypothesis test are summarized in [Table 5](#).

Table 5. Data Hypothesis Test

Method	Z_{count}	Z_{table}	α	Conclusion
Scientific articles	1.7668	0.9945	0.05	H_1 accepted H_0 rejected

Based on the results of hypothesis testing in [Table 5](#) above, it can be explained that learning scientific articles affects student learning outcomes in the Research Methods course. The effect of

learning this scientific article is to improve student learning outcomes which are marked by an increase in the average student test score in the Research Methods course of 7.67. This is an early indication to prove that there is an increase in student Research Method learning outcomes after implementing learning using scientific articles. Furthermore, the magnitude of the increase in Research Methods learning outcomes can be calculated by the N-gain test.

The N-gain test was carried out to determine the magnitude of the increase in student learning outcomes Research Methods using scientific articles. The results of the N-gain test obtained from the pre-test and post-test results show the gain index value obtained is 0.3358. Based on the N-gain category in [Table 1](#), the gain index value obtained is in the medium category ([Jusmawati et al., 2020](#)). Therefore, the use of scientific articles as a learning resource can improve students' Research Methods learning outcomes by 33.58%. The results of this study were not significantly different from the results of [Syahmani & Sanjaya's \(2021\)](#) research which showed that the use of scientific articles as a learning resource increased student learning outcomes in biochemistry by 35%. The research results of [Pohan & Rambe \(2022\)](#) also state that the use of scientific articles as a learning resource can improve students' basic chemistry learning outcomes by 33.58%. Therefore, the research results obtained are consistent with previous studies.

The N-gain test that has been carried out shows that the increase in student Research Methods learning outcomes is in the moderate category because the N-gain values are > 0.30 and < 0.70 ([Jusmawati et al., 2020](#)). Although the increase in learning outcomes is in the moderate category, this does not yet show a substantial (concrete) increase in learning outcomes. Because a substantial increase in learning outcomes must also be marked by changes in behavior such as changes that are conscious, continuous or continuous with other behaviors, useful as provisions for life and positive or accumulated ([Yusnawati, 2016](#)). So that learning scientific articles cannot be said to have resulted in a substantial increase in learning outcomes in Research Methods. Therefore, it is necessary to carry out further testing of changes in student behavior after implementing scientific article learning through analysis of perception questionnaires and student involvement in scientific article learning.

Analysis of Student Perception and Involvement Questionnaire Results in Learning with Scientific Articles

The results of the questionnaire provide insight into student perceptions and involvement in the learning process. The results of the questionnaire on student perceptions and involvement in learning with scientific articles are shown in [Table 6](#).

Table 6. Student Perceptions and Involvement Towards Scientific Articles Learning

Questionnaire	Component	Average (n=30)
Student perceptions of learning strategies	Learning activities that have been carried out	3.93 ± 1.09
	Scientific articles as learning resources	4.03 ± 1.07
	Skills development	3.27 ± 0.92
	Understanding of scientific concepts	3.07 ± 0.98
	Evaluation of the learning process	3.20 ± 0.97
	Average	3.50 ± 1.12
Student commitments of learning activities	Directed learning	3.67 ± 1.15
	Discussion group	3.73 ± 1.15
	Average	3.70 ± 1.11

From [Table 6](#) above it can be seen that the perception and involvement of students classically gives a positive value to learning scientific articles. Based on the reference for assessing perceptions

and involvement in [Table 3](#), student perceptions of learning scientific articles appear to be in the medium category with an average of 3.50 ± 1.12 because the average value or $g > 2$ and < 4 . With an average value above 4.00, the scientific article component as a learning resource is included in the high category (mean or $g = 4.03 \pm 1.07$). Other components are in the moderate category (mean value or $g > 2$ and < 4).

From [Table 6](#) it can also be seen that student involvement in learning both in directed learning and discussion groups is in the medium category because the average value or $g > 2$ and < 4 with an average score of 3.70 ± 1.11 . The results of the student perception questionnaire on the components of scientific articles as learning resources are included in the high category above, reinforced by Sabir's findings that the use of scientific articles to support learning is assessed using the average score of 15 questions displayed in the high category ([Sabir, 2019](#)). Therefore, the research results obtained are consistent with previous studies.

The research results of [Sulistiyarini et al. \(2021\)](#) states that the involvement of scientific articles in the implementation of lectures based on student perceptions is very good at 41%. While the involvement of scientific articles in student research is good at 53%. So that scientific articles greatly influence student academic activities such as lectures and research because they help in extracting the latest information and developing knowledge in a particular discipline. The importance of the consistency of the results of this study with previous research is that researchers can look for comparisons and find new inspiration for future research, position research and show the originality of the research conducted ([Abdussamad, 2021](#)).

Comparisons obtained from the results of this study with subsequent research both show that scientific articles used as learning resources have a high average or g value. The new inspiration found is that learning scientific articles can also be applied to Research Methods courses. While the research position and originality are shown from the results of the latest research that learning scientific articles can improve learning outcomes of Civil Engineering Students of Graha Nusantara University Padangsidempuan Research Methods by 33.58% which is supported by the results of the perception questionnaire and student involvement each with an average score of 3.50 ± 1.12 and 3.70 ± 1.11 .

DISCUSSION

The results of the research show that the learning outcomes of Research Methods students increase significantly after learning through scientific articles. This can be seen from the average test performed which increased from 62.17 ± 8.78 to 69.83 ± 9.42 . Learning from scientific articles has many benefits, including: (1) enabling students to deepen the concepts they have learned; (2) present issues and updates relative to other sources; (3) provides wider access than other learning resources; (4) make it easier for students to continue learning; (5) increasing students' confidence in scientific terminology and methods; and (6) using and training students in critical and scientific thinking which increases their ability to participate in criticizing literary works ([Syahmani & Sanjaya, 2021](#)).

In the context of learning scientific articles in this research, Civil Engineering students at Graha Nusantara University Padangsidempuan need a strong ability to understand the concepts of Research Methods, especially Research Results Reports. Therefore, scientific articles as a learning resource in this course provide opportunities for students to deepen the concepts they have learned before because the effectiveness of learning scientific articles can help students understand and apply research method concepts that need to be explored in depth. The information obtained will depend on the way students input questions. In addition, learning scientific articles can replace human interaction in the context of learning and reduce students' ability to develop interpersonal skills which are important in education ([Sahabuddin, 2023](#)).

Learn from scientific articles presenting issues and updates relative to other sources. This is because learning through scientific articles allows students to find a problem to discuss with the group. The results of the discussion will later produce new findings or theories as a result of updates relative to other sources ([Andriyani & Indra, 2017](#)). Scientific articles are a means to publish ideas, thoughts and research results through various scientific media such as: scientific journals, newspapers or for the benefit of dissemination or seminars on research results. Scientific articles can be obtained

in print or electronic form. So that access is wider than other learning resources (Marwoto et al., 2013). Thus, it is easier for students to learn because they can be accessed anywhere as long as there is an internet network at that place.

Learning from scientific articles can motivate students to seek answers to problems in Research Methods courses. Because students can learn how to write research reports correctly, how to describe the background, methods, results and discussion as well as conclusions and suggestions. Learning scientific articles also makes students more confident in learning because it fosters enthusiasm in learning with learning resources that are more interesting, concrete, easy to understand, save time and effort and have more meaningful learning outcomes (Sahabuddin, 2023). In terms of training students to be able to think more critically and improve their ability to criticize scientific work, scientific articles help students improve these abilities because through this learning students can analyze, evaluate and formulate arguments properly and correctly. Apart from that, students can make the right decisions based on accurate data and help solve complex problems in a logical and systematic way (Susanti, 2023).

The results of the Wilcoxon test on increasing Research Methods learning outcomes show that the use of articles as a learning resource has a significant effect on improving Research Methods student learning outcomes. This is supported by a gain index value of 0.3358 (moderate category). This means that learning from scientific articles increases learning outcomes in Research Methods by 33.58% (Jusmawati et al., 2020). In this way, scientific articles can be used as learning resources in an active learning environment and provide a new approach to teaching Research Methods students (Karim, 2017). Although the increase in learning outcomes is in the moderate category, this does not yet show a substantial (concrete) increase in learning outcomes. Because a substantial increase in learning outcomes must also be marked by changes in behavior such as changes that are conscious, continuous or continuous with other behaviors, useful as provisions for life and positive or accumulated (Yusnawati, 2016). So that learning scientific articles cannot be said to have resulted in a substantial increase in learning outcomes in Research Methods.

The increased learning outcomes of the Research Methods obtained have an impact on student study habits. By learning scientific articles, students will get used to learning by working together through group discussions. So that these students can exchange ideas and gain a lot of knowledge from other students. Good study habits will support the creation of good quality learning as well. Thus, good study habits will improve learning outcomes (Dewi et al., 2013). The N-gain value = 0.3358 is obtained by calculating the difference between the pre-test average score and the post-test average score obtained by students and comparing it to the difference between the highest score obtained and the pre-test average value. Where the gain index value obtained is in the medium category ($g > 0.30$ and < 0.70). This gain index value indicates an increase in learning outcomes caused by the application of learning scientific articles in the Research Methods course.

Scientific articles as a learning resource based on student perception questionnaires on scientific article learning show that scientific articles improve student learning outcomes in the Research Methods and are included in the high category because the average score is above 4.00. Studying Research Reports in scientific articles allows students to learn concepts directly (Syahmani & Sanjaya, 2021) and is a barometer of lecturer performance in the field of empowering education through teaching, research and community service activities, leading to the emergence of new and strategic scientific concepts for education at the tertiary level as a forum for all innovative creative efforts and ideas in learning (Arifin et al., 2020).

In the questionnaire on student perceptions of learning scientific articles, learning resources for scientific articles scored in the high category because based on the results of the questionnaire students were very interested and motivated to learn Research Methods through scientific articles. Because they found a lot of new knowledge from scientific articles (Syahmani & Sanjaya, 2021). This reflects the success of learning scientific articles in the Research Methods course by increasing student interest and motivation to continue learning many new things that are not found in other learning resources.

Choosing quality learning resources can be very meaningful and helpful in achieving learning goals. It is more useful if the learning resources used are quality or high-performance learning resources, rather than learning resources that are diverse but not of high quality (Nur, 2012). Learning from scientific articles allows students to deepen the concepts they have learned. Learning from articles has been used in a variety of approaches, including: scientific articles to address problems, small group discussion materials, starting a journal club, as homework and is more accessible than other learning resources (Syahmani & Sanjaya, 2021). Therefore, the use of scientific articles is very suitable to be applied in Research Methods courses.

Lecturers, especially lecturers in Research Methods courses, can effectively integrate the use of scientific articles in Research Methods courses. With hope, the use of scientific articles can develop new theories that can be applied in research methods. In addition, the new theories discovered can be used as teaching materials or reference books for the development of research technology for students and lecturers. For this reason, researchers suggest that learning scientific articles in the Research Methods course can be continued with different methods, for example: Problem Based Learning (PBL) and Project Based Learning (PjBL). If possible, research can also be developed for students of other study programs or at other universities.

CONCLUSION

Based on the results of the research conducted, it can be concluded that: (1) The use of scientific articles as a learning resource has a major effect on student Research Methods learning outcomes ($Z_{\text{count}} > Z_{\text{table}}$); (2) The use of scientific articles as a learning resource increases student research method learning outcomes by 33.58%; (3) Perception and involvement of students give a classical positive value to learning scientific articles, each in the medium category with an average of 3.50 ± 1.12 and 3.70 ± 1.11 ; and (4) The use of scientific articles as a learning resource is in the medium category according to the N-gain test (gain index = 0.3358) and in the high category according to the results of the student perception questionnaire with an average value of > 4.00 . This means that the use of scientific articles plays an important role in improving students' Research Methods learning outcomes. The results of this study show the effectiveness of learning scientific articles in the Research Methods course. Where is the level of success achieved from learning scientific articles in accordance with the learning objectives that have been planned. Improved learning outcomes, student perceptions and involvement as well as N-gain scores obtained collectively support the effectiveness of learning scientific articles because with students' interest in learning scientific articles in the Research Methods course, student learning outcomes increase.

The results of the research above are very important for the field of education, especially in improving the quality of learning in Research Methods because the results of the research above can be used as reference material for lecturers teaching Research Methods courses in choosing good learning for their students in order to improve the quality of learning Methods Research in his place of teaching. For the academic community, both lecturers and students, it can be used as a reference to conduct further research in terms of learning scientific articles in other disciplines. Lecturers, especially lecturers in Research Methods courses, can effectively integrate the use of scientific articles in Research Methods courses. With hope, the use of scientific articles can develop new theories that can be applied in research methods. In addition, the new theories discovered can be used as teaching materials or reference books for the development of research technology for students and lecturers. For institutions, it is hoped that they will be able to improve the quality of education in Research Methods by developing access to broader scientific articles, for example in the international realm to increase learning resources for students at these institutions. For this reason, researchers suggest that learning scientific articles in the Research Methods course can be continued with different methods, for example: Problem Based Learning (PBL) and Project Based Learning (PjBL). If possible, research can also be developed for students of other study programs or at other universities.

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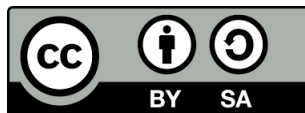
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