



## Learning Strategy of Think Talk Write Based Inquiry Approach Toward the Scientific Communication Ability of Students

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### Abstract

This study has purpose to determine the comparison of the scientific communication ability of students between groups using the think talk write learning based inquiry approach to groups using the experimental learning, and determine the relationship between students' initial ability and students' scientific communication ability. The study was conducted with an experimental approach carried out in grade XI Persiapan Grafika SMK Islam Al Bisyrri Semarang, by comparing the Think Talk Write learning groups based inquiry approach to the experimental learning. The variables studied were scientific communication ability obtained through observation during the learning process. The data were analyzed using Mann Whitney U and Spearman Rank. The results showed that the scientific communication ability of the think talk write based inquiry approach learning group based on the inquiry approach reviewed from four components, the Think Talk Write based inquiry approach learning group had the ability to access and utilize the latest library resources, the ability to contribute ideas in group work, the ability to prepare reports in accordance with the guidelines for scientific paper reports, it is better than the experimental learning, however, in the component of communicating products or reports verbally (presentations) did not show a significant difference between the think talk write based inquiry approach learning group and the experimental learning group. The initial ability of students does not affect the scientific communication ability of students in the think talk write learning group based inquiry approach and experimental learning groups.

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## INTRODUCTION

Physics is one of the subjects in the science family which refers to the development of analytical skills inductive and deductive analytical thinking, used to solve problems related to natural events qualitatively and quantitatively by using mathematics and can develop knowledge, skills and attitudes of confidence. The ideal physics learning process is the interaction between the teacher and students and the reciprocal communication that takes place in educational situations to achieve learning goals (Rustaman, 2005). Communication is an important part of the learning process so that students can know their abilities. Through communication, students can express their ideas and opinions in accordance with the knowledge they have. Communication is a skill to convey their findings to others both orally and in writing. Communication in written form can be in the form of compilation of reports, making paper, composing essays, making drawings, diagram tables, graphs (Semiawan, 1992). Communication can help students to transform concepts that are mastered with the skills possessed (Jurdak, 1998)..

Students must have the ability to communicate in accordance with science, this communication is called scientific communication. Scientific communication is the ability to convey scientific messages carried out between two or more people in a scientific manner as well (Sapriati, 2011). Scientific communication is one of the pillars of physics so it is important to be mastered by students so they can learn well and understand the concepts of physics well. Scientific communication requires students to play an active role in learning so that students not only memorize formulas and write answers but understand the process of getting those answers. According to Levy (2008), scientific communication can be seen from the ability in terms of: 1) accessing and utilizing the latest library resources; 2) contribute ideas in group work; 3) prepare reports according to the guidelines for scientific papers (written) and 4) communicate the product or report verbally (presentation).

Observation conducted in SMK Islam Al Bisyrri Semarang grade XI showed that in the

physics learning, students have difficulty understanding concepts illustrated in a physics equation. Students simply write and memorize physical equations, and solve example problems according to procedural terms. Students do not understand the meaning, concept and language meaning of the equation. Students also do not care how to explain answers using correct language, how to put ideas or points in the picture, how to be a good listener in discussions, embarrassed to ask if there are difficulties even students do not care about the goals and benefits of learning physics. For students what is important is the right answer and the grades go beyond KKM. This is the condition that makes the level of understanding of physics becomes low.

One of the concepts of physics that is difficult to understand is fluid. The concept of fluid has actually been introduced to students since junior high school. Although this material is re-studied in high school, students still find it difficult to understand fluid concepts and apply them to various problems. One of them is in the concept of dynamic fluids, formulations on fluids explain various factors of natural phenomena related to the concept of fluids to form causal relationships that can only be found through logical inference and the use of symbolic language. In general, students view the concepts of fluidity as difficult and abstract concepts. This matter happened since in the learning of fluid material, students only listen to and record fluid laws without really understanding the concepts of fluidity being learned.

The problems that occur is indicated as a result of the learning strategies implemented by teachers in the classroom do not involve students optimally. Students are not accustomed to describing and explaining answers to questions or concepts of physics that have been learned. Students sometimes even still have difficulty understanding story problems. This is because the scientific communication skills of students are still low. Students play more of a role as recipients of the material so that students' dependence on teachers is still high. Sumirat (2014) states that students' weakness in communication ability is caused by many students who are directed to be able to answer questions according to the

examples given by teachers who are more concerned with correct answers than thinking about ways students can communicate their ideas orally or in writing.

The classroom atmosphere also needs to be built in such a way that students can get the opportunities to interact with each other. The teacher needs to create a learning atmosphere that provides the opportunities for students to work well together. One of them is using a cooperative model with a small grouping. The groupings in learning activities provide opportunities for students to discuss the problems encountered. Exchange ideas between students and debate alternative problem solving solutions that will be used. Discussion can reduce the doubts that each student has when doing his own thinking (Campbell, 1969). Therefore, discussion in learning is possible to provide better solutions to solve problems than students working alone. Discussion can train students to communicate scientifically starting with small groups. One important implication of Vygotsky's theory in education is the need for classes in the form of cooperative learning between students so students can interact in completing assignments and can come up with effective problem solving strategies within each of their zones of proximal development. Cooperative learning is a learning system that gives students the opportunity to work together with fellow students on structured tasks (Lie, 2005).

*Think talk write* is one of the type of cooperative learning that is appropriate as an alternative to learning physics. Think talk write strategy introduced by Huinker and Laughlin (1996) is basically built through thinking, speaking and writing. This strategy begins with students reading material that has been packaged with a constructivism approach to understanding the content (think), then students communicating to get a common understanding (talk), and finally discussion and negotiation, students write the results of their thoughts in the form of summaries (write). This think talk write learning strategy will be integrated with an inquiry approach so that students can communicate scientifically well based on the results of knowledge from critical and analytical thinking processes by experiencing learning experiences on their own. Inquiry

provides an opportunity for students to explore knowledge by means of inquiry. Students can find their answers about physics lessons by observing various events in daily life (Gibson, 2002). In learning physics, communicating by analytical writing is very important because it can help students transform their basic ideas into more coherent and structured knowledge (Rivard, 1999). Research on Sumirat (2014) states that students' mathematical communication skills by using think talk writers are higher than which uses expository learning. Mathematical communication skills of students can be expressed by seeing the results of students' reflections and ideas as written through writing. Ramadhani (2015) also states that project-based learning with think-talk strategy and scientific creativity can improve high-level cognitive learning outcomes of high school students.

This study was done to find out: 1) the comparison of students' scientific communication ability between groups that are given *think talk write* based inquiry thinking approach to the learning using experimental learning. 2) the relationship between students' initial ability and students' scientific communication ability in the *think talk write* based inquiry learning approach.

## METHOD

This study applied an experimental approach using the population of students grade XI Persiapan Grafika SMK Islam Al Bisyrri Semarang. The class was divided into 2 groups, the learning group of think talk write based inquiry approach and the learning groups using the experimental learning. The variables studied were initial ability and scientific communication ability with indicators: 1) accessing and utilizing the latest library resources; 2) contribute ideas in group work; 3) prepare reports according to the guidelines for scientific papers (written) and 4) communicate products or reports verbally (presentations). The data obtained were analyzed using the U Man Whitney test and Spearman rank correlation.

## RESULT AND DISCUSSION

Think Talk Write learning is one of the learning strategies that integrates the process of thinking (think), speaking out opinions in discussion forums (talk) and writing down the results of the discussion (write). This research applied the think talk write process in inquiry learning. Inquiry based Think Talk Write learning is meant at the learning stage of Think Talk Write included elements of the inquiry approach. Students were given material in order to find the problems encountered. Then they make their own problem form by discussing with their friends (observation). After that, they made their own experimental designs to solve the problems experienced. They test and retrieve data then they make conclusions from the results of experiments conducted. In the next stage students present experiments conducted later from the presentation material made a report.

In the first stage of Think Talk Write learning based Inquiry Approach, students were given material about dynamic fluid. Each student reads and analyzes it. Students write down the difficulties experienced after reading and analyzing the material. After that, entering the second stage, discussing the problems of each individual with each group. They discussed until they can obtain an agreement to solve the problem.

Each group selected their own method for solving their problems. Each group selected one of their problems to solve. There was a solution to this problem based on an analysis of the experiments that have been strung together. After each group obtained a solution, they presented their group's problems together with their solutions. At the time of presentation, there were inputs that were used to improve the solution of the problem. Entering the third stage of Think Talk Write learning based Inquiry Approach, writing the results of the discussion and presentation conducted in the form of reports.

### Scientific Communication

#### 1) The Ability in Assessing and Utilizing the Latest Library Sources

The ability of students to access and utilize the latest library sources can be seen from the

ability of students to access the latest and relevant library sources, choosing and using quality library sources (journals, scientific papers, reference books) and writing the literature in the script correctly. The average ability to access and utilize the latest library resources in think talk write learning reaches 67.86 while in experimental learning is 59.62. Based on the results of the Mann Whitney U Test obtained sign value = 0.004 < 0.05, which means that there are significant differences between the two groups. Based on the average score, it can be seen that through the learning of Think Talk Write based inquiry approach, the ability to access and utilize the latest library resources is better than the experimental learning in the control group.

#### 2) Contributing Ideas in the Group Work

The ability of students to contribute ideas in group work can be seen from the involvement of students in completing assignments, the contribution of students in designing and answering oral exam questions, and the ability to explain theories in experimental design in groups. The average ability to contribute ideas in group work on learning thin talk writers reached 83.33 while in experimental learning amounted to 75.32. Based on the results of the Mann Whitney U Test the sign value = 0.039 < 0.05, which means that there are significant differences between the two groups. Based on the average score, it can be seen that through the learning of Think Talk Write based inquiry approach, it has an impact on the ability to contribute ideas in group work better than the experimental learning.

#### 3) Preparing reports according to the Report of Scientific Papers

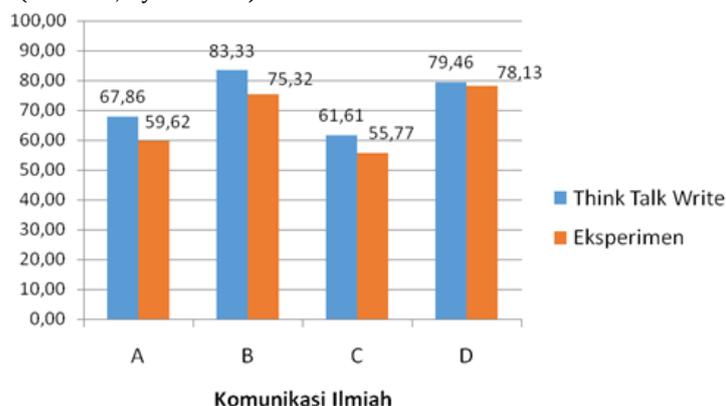
The ability to compile reports according to the guidelines of scientific work reports can be seen from the results of the assessment of reports made by students with their benchmarks: systematic reporting and completeness, quality of exposure to literature review, discussion of results and writing of literature. The average ability to compile reports in accordance with the reports of scientific papers on think talk write learning reaches 61.61 while in experimental learning is 55.77. Based on the results of the Mann Whitney U Test the sign value = 0.018 < 0.05, which means that there are significant differences between the two groups. Based on the average score, it can be

seen that through the learning of Think Talk Write based inquiry approach has an impact on the ability to compile reports in accordance with guidelines for scientific reports better than the experimental learning.

**4) Communicating Products or Report Orally (presentation)**

Students' ability to communicate products or reports verbally can be seen from the appearance of the media used, the ability to explain the material (focused, systematic) and the

quality of the display, the use of language (standard, clear, sound), the ability to argue (oral and written). The average ability to communicate products or reports verbally through the presentation process in learning to talk write reaches 79.46 and in experimental learning is 78.13. Based on the Mann Whitney U Test results obtained sign value = 0.956 > 0.05, which means that there is no significant difference between the two groups.



- A. Mengakses dan memanfaatkan sumber pustaka mutakhir.
- B. Menyumbangkan gagasan dalam kerja kelompok
- C. Menyusun laporan sesuai panduan laporan karya ilmiah (tulisan)
- D. Mengkomunikasikan produk atau laporan secara lisan (presentasi)

**Figure 1.** The Average Score of Scientific Communication

As can be seen from the four components of scientific communication skills, in learning think talk write has a higher ability in the aspect of contributing ideas in group work, followed by the ability to communicate products or reports verbally, the ability to access and utilize library resources and most recently is to access and utilize sources cutting-edge library. The ability to communicate products or presentations from the two groups is relatively the same. This happened since the two groups are used to presentations in front of the class in previous lessons.

**Correlation between the Initial Ability and Students' Scientific Communication Ability**

The relationship between initial ability and students' scientific communication ability in the think-talk learning based inquiry approach can be seen from the Spearman's rho correlation coefficient as listed in Table 1 below.

**Table 1.** Correlation of Rank Spearman Rho

	A	B	C	D	Initial Ability	
A	r	1.000	0.340	0.621**	0.543*	0.289
	Sig.		0.132	0.003	0.011	0.204
B	r		1.000	0.500*	0.231	0.429
	Sig.			0.021	0.313	0.052
C	r			1.000	0.608**	0.091
	Sig.				0.003	0.695
D	r				1.000	0.017
	Sig.					0.942

#### Interpretation

- A. Assessing and Utilizing the latest library resources
- B. Contributing ideas in the group work
- C. Preparing reports according to the guideline of the scientific report paper (written report)
- D. Communicating products or reports orally (presentation)

Table 1 shows that there was no significant relationship between initial ability and scientific communication, as evidenced from the significance value  $> 0.05$ . The data shows that the scientific communication created when learning think talk write is not influenced by the students' initial abilities. However, when learning to think talk write there are links between the components in scientific communication. The ability of students to access and utilize the latest library resources turns out to be closely related to the ability to compile reports in accordance with scientific work guidelines, as evidenced by the correlation value of 0.621 with a significance of  $0.003 < 0.05$ . This ability is also closely related to communicating products or reports verbally. The ability of students to contribute ideas when discussing turns out to be closely related to students' ability to prepare reports, as evidenced by the correlation value of 0.500 with  $\text{sign} = 0.021 > 0.05$ . The ability of students to compile reports was closely related to the ability to report products or reports verbally, as evidenced by the correlation value of 0.608 with a significance of  $0.003 < 0.05$ .

The results of the correlation analysis show that the ability of students to access and utilize the latest library resources is important, because through these learning resources students learn to find references as supporters in experimental activities when learning inquiry. In think talk write activities, there are activities to write reports with procedures such as writing scientific papers. In compiling the report, it cannot be separated from the writing of the theoretical basis and the writing of the bibliography, so that the activity of accessing the latest sources of literature becomes an important part of the learning. Literature sources other than as a reference to be taken in writing a report, also as a source of student knowledge. This has a positive impact on the ability to present products and reports verbally,

since those conveyed orally is influenced by the writing made and the knowledge gained by the learners.

The ability to contribute ideas during group discussions has a positive effect on the ability to write reports. Students who have knowledge because reading from various sources become equipped in providing ideas or ideas when discussing groups. The results of the group discussion are the basis for writing reports, making analyzes, linking the results of experiments with theoretical studies and making conclusions. The ability of students to prepare reports is closely related to the ability to communicate reports or products verbally. The material communicated in the form of a presentation is the essence of the explanation of the material written in the report in writing. When the results of the writing already describe the results of the experiment, the relationship between theory and practice and produce the right conclusions will be a source of reference for students in writing a summary in the form of presentations that will be reported verbally.

The results of data analysis using the U mann whitney test showed that there were significant differences in the ability of scientific communication between groups using inquiry-based think-talk learning strategies, in terms of accessing and utilizing the latest library resources, contributing ideas in group work and compiling reports according to guidelines scientific report. The ability of scientific communication on aspects of accessing and utilizing library resources, contributing ideas in group work, compiling reports according to the guidelines of scientific reports on learning think talk write based on inquiry approach is significantly higher than experimental learning which is usually done, but on aspects of communicating products or oral reports there were no significant differences between the two groups.

The data shows that think talk write learning based inquiry approach influences scientific communication skills. Scientific communication can be seen from a series of learning activities in the discovery process through experimental activities that combine the process of utilizing the latest sources of literature as a reference or theoretical source of knowledge,

carrying out experimental activities and followed up with a discussion process. The discussion process aims to accommodate the ideas or ideas of students on the basis of knowledge they obtain from theoretical sources and from practical activities. This process emphasizes the act of thinking (think) and devote it in group discussions. The ideas in his mind based on theoretical studies and practical experience are poured out in the form of writing in the form of a report in accordance with the guidelines for scientific work reports.

The writing that is made is not just any writing since it must meet the rules of writing scientific papers which contain introduction, literature review, experimental results, discussion, conclusions and bibliography. This activity emphasizes the process of writing (write). The results of the subsequent scientific papers are reported verbally through presentations. What has been written is then taken up the main parts or the essence of the essence written in the media presentation and communicated verbally. This activity emphasizes the process of talking (talk). Although the ability to communicate reports verbally is not significantly different between think talk write learning and experimental learning, however, this ability ranks second after the aspect of expressing ideas in discussion.

This shows that in the previous activity which was often done in the form of experimental learning, students had been accustomed to communicating the results of their experiments in the form of presentations. Making reports on the results of experiments using the rules of writing scientific papers has not been accustomed to before, as evidenced by the results of the u mann whitney test, in that aspect a significant difference occurred. Through think talk write learning in the inquiry approach gives an impact on the ability to make written reports that are better than experimental learning, even though the results are not optimal. The average ability to write reports reaches 61.61 in the learning think talk write higher than the experimental learning with an average of 55.77. This is less optimal since the writing of reports in the form of scientific papers has only been applied in the learning of think talk write, therefore, to improve the quality of the

results of writing it needs to be continually habituated.

The compilation of reports with the rules of writing scientific papers parts that require access to the latest sources of literature. This activity is also not optimal, because students cannot access the internet at school. The Pondok Pesantren-based school does not trust its students to access the internet with the excuse of preventing negative accesses. As a result, in this study the library sources only rely on the literature of books in the library. Because this think talk write learning emphasizes the process of accessing library resources even though only in the scope of the library has an impact on the ability to write reports better than experimental learning.

The highest ability in scientific communication is the ability to express ideas in discussion activities. Based on the data obtained an average in this aspect reached 83.33 and higher than experimental learning which reached 75.32. Discussion is an activity carried out before and after the experiment. Before the experiment, a discussion was held to bring together various opinions about the sources of literature which will be used as a reference in experimenting and at the same time as material in writing a literature review in an experimental report later. Discussions were also held after the experiment as a venue for expressing ideas about the relationship of experimental results with the study of theory, analyzing the results of experiments and making conclusions.

In general, scientific communication skills are formed because think talk write learning combines independent learning processes that do not only rely on the teacher as the only source of learning. This learning is more directed to the search for theory and practice to prove the theory that has been read, facilitate the outpouring of ideas and submitting reports in writing and orally. Agree with Inoue (2019) which states that inquiry learning is used by teachers to build student personality. The habits of students to create ideas during learning. This inquiry learning is also used to overcome the boredom of learning in the classroom. Teachers and students tend to discuss to solve a problem compared to just listening to lectures.

Think talk write learning based on this inquiry approach is learning by collaborating between knowledge obtained from relevant library sources and the results of experiments or practicums and expressed in written form in the form of scientific papers. This process challenges students in groups to analyze information, establish cooperation. This agrees with Biasutti (2011) that collaborative knowledge activities can enhance the development of ideas, skills in analyzing information, and increase the ability of teamwork among group members. Writing reports on the results of experiments that contain elements of theoretical study and bibliography guides students to look for relevant sources. The impact is increasing knowledge, making students more focused on learning activities. This is in line with Haristy (2013), which states the use of other library resources can also help students focus their thoughts on learning activities and reduce the time to be quiet and play around.

Another advantage of learning through think talk write based on inquiry approaches provides students the opportunity to have discussions. The discussion that was carried out in two stages before and after the experimental activity challenged students to express their opinions and argue. Based on the data it turns out that this aspect ranks first compared to other components in scientific communication. This shows that learning is able to bring a more conducive learning atmosphere in scientific communication. The results of the study are also similar to Chen (2014) that students' personal knowledge and experiences influence student learning to argue. Teachers can also consider their argumentative abilities in the learning process. The results showed that the ability to argue and express opinions in discussion forums was closely related to the ability of students to make presentations or communicate their reports verbally.

This is in accordance with the opinion of Kumara (2001) that the ability to express opinions verbally can train students to enrich vocabulary and express the information they have. Students can choose vocabulary to express answers clearly. The ability to speak verbally also reflects the strengths and weaknesses of cognitive processes. Dewi's research (2017) also states that through

inquiry learning, students can construct their knowledge through social communication activities. Discuss and ask questions between friends and with the teacher. These communication ability is used to prepare for the face of life that refers to regional cultural values.

The collaborative process of experimentation through the inquiry approach in think talk write learning highlights the process of theoretical knowledge being strengthened by direct experience through proof. This process has an impact on scientific communication better than experimental learning alone. The thinking patterns of students are directed coherently from the process of thinking (think) by referring to the sources of theory, collaborating to discuss (talk), experimenting or carrying out the process of proof (inquiry), discussing the results of the experiment again (talk) followed by writing in language writing coherently based on established rules (write) and communicating the results of the report verbally (talk) through presentations. From these activities various knowledge and skills were accommodated to develop. This is in line with Dewi (2013), students can be more active and encourage scientific attitudes such as inquisitive, critical, open attitude and cooperation.

In scientific communication ability, there are four components that are used as a basis for student achievement. The first component is accessing and utilizing the latest library resources. In this first component there are three indicators, namely (1) accessing the latest and relevant library sources, (2) selecting and using quality library sources (journals, scientific works, reference books), (3) writing the literature correctly in the manuscript. Test results Whitney U in the first component obtained a significance value below 0.05, which shows that the experimental group on the component accesses and utilizes the latest library resources better than the control group. Students actively seek other sources of literature that are compatible with dynamic fluid material to solve problems was found. Students are required to read other literature sources and find things related to dynamic fluid. Library resources that are appropriate with dynamic fluid material can help students to develop their knowledge by collaborating information accordingly.

The second component is contributing ideas in group work. This component has three indicators, namely (1) involvement in completing tasks. (2) contributions in designing and answering oral exam questions. (3) explain the theory in experimental design in groups. The results of the Mann Whitney U test obtained a significance value  $<0.05$ , which means that there are differences in the second indicator of students' scientific communication skills in the experimental and control groups. From these results it was found that the second component of the experimental group was better than the control group. The experimental group is more active in discussions with fellow group members because students are required to think harder in solving problems. Students are required to exchange ideas and express ideas compared to the control class that already has a flow of problem solving that must be done. In the indicators explaining the theory students are somewhat difficult to string words. They are not yet accustomed to expressing explanations of the theory independently. This is also influenced by the limited literacy used. In addition to the limited books owned by schools, students also find it difficult to access information from the internet. Therefore, they can only explain the theory of research according to their own literacy, experience and development of thought.

The results of this study are consistent with Derby (2007) which states that debate is a teaching-learning strategy for developing critical thinking and analytical skills while developing teamwork and communication. debating is an effective pedagogical strategy because of the level of responsibility for learning and being active. Involvement is needed by all debate students. In addition, it provides experiences where students can develop competence in researching current problems, preparing logical arguments, actively listening to various perspectives, distinguishing between subjective and evidence-based information, asking convincing questions, integrating relevant information, and formulating their own opinions based on evidence. Hall's research (2011) also provides an explanation of the importance of debating in the discussion process. Debates require students to work alone or with others for critical research problems, present reasonable arguments, actively listen to various

perspectives and weigh those perspectives on literature and personal values / beliefs, distinguish between information and anecdotal evidence, and ask the necessary questions . Debate also enhances student confidence, fosters respect among students, facilitates students' ability to maintain calm, and enhances students' ability to articulate their own thoughts based on evidence. Ginanjar (2015), Marhamah (2017) also provides an explanation that ways are developed in the Argument Driven Inquiry model in Science Learning can train students' scientific argumentation skills.

Wahdan (2017) provides an explanation that the factors that affect students' scientific argumentative ability are students' understanding of the material and the involvement of students in argumentation activities during the learning process. Understanding of students is said to be good if students are able to answer questions with various types of questions. Inadequate involvement of students during the learning process, it is possible to influence the ability of students to argue scientifically. This happened since students are less trained to argue scientifically.

The third component is compiling reports according to the guidelines for scientific papers (written). This component consists of four indicators, namely (1) systematic reporting and completeness. (2) the quality of the literature review exposure. (3) discussion of results. (4) library writing. The results of U Mann Whitney obtained significance values below 0.05, which means there are differences in the third indicator of scientific communication skills of students in the experimental and control groups. From these results it was found that the third component of the experimental group was better than the control group. In writing a systematic report given by the teacher, the experimental and control groups are equally in accordance with the systematic. On exposure to the literature review, the experimental and control groups still experienced problems due to literacy limitations. Meanwhile, in the discussion of the results of the experimental group better than the control group since in the experimental group students have more experience and thought development because they

are more active in solving problems with the lack of direction from the teacher.

The results of this study are also in line with research conducted by Cahyani (2010) who conducted research on research-based paper writing. Writing a paper with a research learning model makes students more able to think critically so that they do not simply trust the information obtained. They continue to test the truth of information. Students feel enthusiastic when doing research because they gain new knowledge and skills. Papers made not only based on the theory in the book but also based on the experience they experienced. Other impacts experienced after conducting this research are increased communication with others, the ability to work together, respect the opinions of others and be creative in solving problems. . This results in the lack of errors in writing reports because members with each other work together to correct reports made.

Other research by Baidowi (2015) provides an explanation that students are challenged to solve real problems through project activities to write scientific geography. This is proven when the teacher gives a choice between using real problems around the neighborhood or using problems that can be found on books or the internet. Sejati (2016) in her research provided an explanation that the outdoor study learning method affected the ability to write high school geography scientific papers.

The fourth component is communicating the product or report verbally (presentation). This component consists of four indicators, namely (1) concept content in technology products (power point, CD, media). (2) ability to display material (focused, systematic) and display quality. (3) use of language (standard, clear, sound). (4) the ability to argue (oral and written). The results of U mann whitney obtained a significance value at  $> 0.05$ , which means there is no difference in the fourth indicator of students' scientific communication skills in the experimental and control groups in the fourth component. From these results, it was found that the fourth component of the experimental group was no better than the control group. There are indications that the presentation activities in front of the class become part of the

learning activities that are normally done previously.

Siswanto's research results (2014) also provide an explanation that questioning and reasoning activities can support to arouse students' skills in argumentation. Questioning and reasoning activities can train students in speaking, asking questions, giving answers logically, systematically, and using language that is good and right, and encourage students to discuss, argue, develop thinking skills, and attract conclusions. Budiyo (2016) Learning Argument Based Science Inquires a good impact on students' argumentative abilities Hasil penelitian Siswanto (2014) juga memberikan penjelasan bahwa kegiatan.

## CONCLUSION AND SUGGESTION

The results of the study conclude that there are differences in the ability of scientific communication in the Think Talk Write learning group based on inquiry approach and Experiment learning can be seen from four components, namely the Think Talk Write Based Learning Approach learning group has the ability to access and utilize the latest library resources, the ability to contribute ideas in group work, the ability to prepare reports in accordance with the guidelines for scientific work reports, is better than experimental learning in the control group, but in the component of communicating products or reports verbally (presentation) there is no significant difference between the Think Talk Write learning group based on inquiry approach and the group experimental learning. Students 'initial ability does not affect students' scientific communication skills in Think Talk Write learning groups based inquiry approach or the experimental learning groups.

Research on this think talk write learning strategy based inquiry approach can be developed more broadly, especially regarding student creativity, student activity, and students' abilities in scientific communication. Future studies are suggested to take other concepts that are in accordance with the inquiry talk write strategy based on the approach inquiry applied, so that they can find out these learning strategies that can

affect student learning outcomes with different concepts

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