

THE EFFECT OF CTL-BASED LEARNING VIDEO USE ON THE ABILITY TO COLLABORATE AND COMMUNICATE WITH SCIENCE STUDENTS OF CLASS X SMA NEGERI 1 GIDO

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ABSTRACT

This study aimed to see the effect of using CTL-based learning videos on science communication skills and student collaboration in class X MIA SMA Negeri 1 Gido. This study is a quasi-experimental study with a one-group pretest-posttest design. This study uses Class X MIA 2 as the sample class. The data were obtained by using the observation sheet of science communication skills and student collaboration. The results showed that there was an increase in the value of students' science communication skills and collaboration. The posttest score of students' science communication skills was 80.8 and the pretest score was 49.6. The posttest score of students' collaboration ability was 83.8 and the pretest score was 58.2. Based on the results of this study, it can be concluded that there is a positive effect of using CTL-based learning videos on the science communication skills and collaboration of Class X MIA students of SMA Negeri 1 Gido.

Keywords: *Collaboration and communication skills, video, contextual teaching and learning, jigsaw.*



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I. INTRODUCTION

The development of science and technology is progressing rapidly. By this time, the development had reached the era of the Industrial Revolution 4.0. Industrial Revolution 4.0 is an era where the technology used in the industry combines cyber technology and automation technology. Production or other industrial activities are carried out automatically controlled using cyber technology.

The 4.0 industrial revolution is a new challenge that must be faced by various countries. The success and failure of the state in facing these challenges will cause gaps between countries. Therefore, various countries are preparing to face this era of revolution including Indonesia. Indonesia is one of the countries facing challenges in this revolution. In the face of the challenges of the industrial revolution 4.0, the Indonesian government issued various policies in the face of this era. One of the policies issued is to improve the level of quality of Indonesian human resources (HR). HR is the people who are the initiators of ideas, planners, movers, and validators in achieving a goal. Improving the quality of human resources is one of the important things in facing the challenges of industrial revolution 4.0 because hr will organize the existing system. Indonesian human resources are on the index of 0.54[1]. Indonesia's human resources index is still low[1]. Judging from the data, Indonesia urgently needs to maximize the implementation of policies to improve the quality of human resources. Improving the quality of human resources in question is done by improving the quality of education of a country.

Education is one of the indicators of the quality of human resources set by UNESCO because education is an important element in a civilization. Education is a way to develop one's potential. The development of human self-potential is in harmony with the quality of HR. Quality human resources will be able to live and compete in global civilization.

There are various ways the Indonesian government does to improve the quality of education. One way is to continue to improve the curriculum that applies in Indonesia, taking into account input or advice from experts in the field of education through the Ministry of Education and Culture of the Republic of Indonesia. The education curriculum in Indonesia has undergone several changes since Indonesia's establishment until now. The Indonesian Education Curriculum used at this time is the 2013 curriculum. This curriculum contained a variety of subjects. Physics is one of the subjects contained in this curriculum.

Physics learning is required to be able to improve 4C skills (Communication, Collaboration, Critical Thinking, and Problem Solving, and Creativity and Innovation). These 4C skills are trained in the learning process. For learning to be carried out by the expected, it is necessary to plan for the learning to be carried out [2]. The thing that must be prepared for them is the medium of learning. The medium of learning is tool to deliver teaching materials that can be used to stimulate the student's mind in understanding the material[3]. The learning media used must be interesting, effective, efficient, and varied in the delivery of material. One of the media in question is video learning[3]. Some benefits of using learning videos include: (1) can display graphs, diagrams, and images; (2) can be used wherever and whenever learning time; (3) videos adjustable speed and repetition its use, so as to help students better understand the content of the video; (4) can be used by one person, a group or classically and used as feedback; (5) the video display size is so flexible that can be set according to need. [4]

Based on the results of an interview with one of the teachers, the media used by teachers at Sma Negeri 1 Gido is a video explaining the use of formulas. The video used cannot hone students' collaboration and communication skills, because it is not designed to be interactive and one-way.

The teacher said that the student's inactivity in learning is also apparent when there is a group discussion. Group discussions are conducted through small Whatsapp groups. During the discussion, the teacher noticed that few students participated in the discussion. This shows that students' ability to collaborate is low.

Teachers convey the communication skills of science students are also low. This can be seen in the task or daily assessment. From some of the samples taken, it turns out that students are still not able to describe the idea well. On questions that ask for explanations, students only write the main sentence without explanatory sentences. Some add explanations however, the explanation is not in-depth and still shallow. The physics research team led by Dr. Desnita, M.Si has developed a CTL-based learning video in 2019. The learning video has gone through a validity test. The video consists of 2 to 3 units of video of the event. The results of validity tests conducted by learning experts state that the contextual-based physics learning video to be used is valid[4]. This validity is seen from 3 aspects, namely construction with a score of 0.84, language feasibility with a score of 0.87, and graphics with a score of 0.84[5]. In each video, there is footage of several events related to impulses and momentum and simple harmonic vibrations. In the video, students are presented with material using a Contextual Teaching and Learning approach. Contextual Teaching and Learning (CTL) is one of the learning strategies that prioritize the process of student involvement directly to be able to find the various meanings of the material learned and relate it to real life situations every day.[6]

The video shows the relationship between matter and context in everyday life. By associating the subject matter with a context close to the student's life, can make the student's learning motivation increase, and the learning done can be effective and efficient. Therefore, researchers propose the use of this learning video to be a solution that can be used to overcome the above problems.

There has been a lot of research done to improve 4C skills, but it is still dominated by critical thinking skills and creative thinking skills. There is still very limited research on efforts to improve the skills of collaborating and communicating science through physics learning. Both of these skills are more basic skills, which contribute to students' thinking skills. Because the way students communicate an idea will reflect whether or not the student has critical and creative thinking skills.

Communication skills are an important skill possessed by everyone in this millennium era. Communication is very important to be used to convey creative ideas so that they can be realized. In learning physics, students should be given the opportunity to express his opinion in the process learning, so that students can build their own knowledge through communication and experiences that he experienced alone.[7] If communication skills are low, then these creative ideas cannot be conveyed properly. This results in these creative ideas not being realized properly.

In addition to the above, communication skills have become important because many professions in this millennium era require good communication skills. Some of the professions include writers, journalists, reporters, radio broadcasters, announcers and presenters, marketing, public relations, and others. This is also supported by the results of research conducted by Jacob, Gunawan, and Halim in 2015. The conclusion of this study revealed that the ability to communicate positively affects employee performance. This ability to communicate is the dominant variable that affects employee performance[8]. This is because the ability to communicate is very instrumental in knowing how to put yourself in different situations with colleagues to get maximum work results [8].

The ability to collaborate is also important in this millennium era. In this era, the ability to collaborate is needed in various aspects of life. The ability to collaborate is essential in an organization, business, work, and everyday life. This ability to collaborate is essential for the development of yourself as well as the group. In this millennium era, generally, companies provide conditions to work together in teams to prospective employees. This requirement is very important because the ability to work together (collaboration) in a team greatly affects employee performance. This was supported by Kadafi in his research. Kadafi pointed out that teamwork has a very important role in the performance of microfinance institutions (MFI) XYZ Samarinda. It is very important to maintain a work culture [9].

Based on the results of research conducted by Waisnawati in 2015, learning videos can be one solution to improve students' communication skills. Waisnawati concluded that a video-based scientific approach to learning is better applied to develop students' speaking skills to be more independent [10].

Based on the background that has been submitted, researchers plan to conduct a study entitled "The Effect of CTL-Based Learning Video Use on the Ability to Collaborate and Communicate Science Students of Class X SMA Negeri 1 Gido".

II. METHOD

The type of research used in this study is quasi-experimental. This experiment is a development of true experimental [11]. The characteristic of this experiment is that it has a control group, but cannot function fully to control the external variables that influence the execution of the experiment.

According to Sugiyono, a population is an object that is set to be studied and drawn to conclusions. The population of the study was a student of Class X MIA SMA Negeri 1 Gido Year of Study 2020/2021. Class X MIA SMA Negeri 1 Gido School Year 2020/2021 consists of two classes, namely X MIA 1 and X MIA 2. The sample withdrawal method is simple random sampling. Sampling is done randomly without regard to the strata in the population [12]. From the results of sampling obtained class X MIA 2 which became a sample in this study. Research variables in research are free variables (use of CTL-based learning videos), bound variables (skills to collaborate and communicate student science), and control variables (approaches, learning models, and textbooks).

This study used quantitative data types as research data. Quantitative data is an assessment of the ability to communicate science and collaborate in the form of numbers. The data source in the study was a student of class X MIA state high school 1 Gido with one class randomly selected as a sample of the study.

The research instruments used in this research are instruments of assessment of students' science communication skills. Assessment instruments of students' science communication skills in the form of observation sheets of science communication skills and assessment sheets of records of student work. The next research instrument is the instrument of assessment of the ability to collaborate. Collaboration capability assessment instruments in the form of observation sheets.

III. RESULTS AND DISCUSSION

Collaboration ability data is measured using 5 indicators, namely confidence, positive attitude, appreciation, encouragement, and building group spirit. The research instrument used to measure collaboration capabilities is the collaboration capability observation sheet. For collaboration ability data before treatment, the highest score was 70, the lowest score was 45, the average score was 60.2 with less predicate and the standard deviation was 6.6. Briefly, the distribution of collaboration capability data before treatment is presented in table 1.

Table 1. Collaboration Capability Pretest Distribution

Value	F
45-49	2
50-54	5
55-59	9
60-64	11
65-69	6
70-74	3

Collaboration capability data after treatment gets a maximum value of 95 and a minimum value of 70. The average value of collaboration capability data after treatment is 85.8 with a standard deviation of 6.2. Briefly distribution of data dissemination of collaboration capabilities of class X MIA 2 students in table 2.

Table 2. Distribution Posttest Collaboration Capabilities

Value	f
70-74	3
75-79	5
80-84	9
85-89	11
90-94	7
95-99	3

The average value of student collaboration ability for each indicator before and after treatment can be seen through Figure 1.

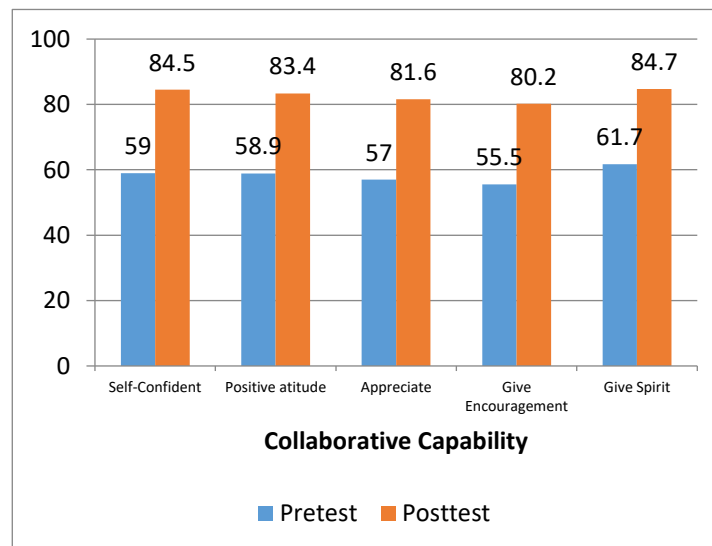


Fig. 1. Collaboration Capability Graphic

From the graph, it can be seen that there is a difference between the average value of student collaboration ability before and after treatment for each indicator of collaboration ability. In the graph above, the blue diagram is the average value before the treatment, while the red diagram is the average value after the treatment.

Data on science communication skills are measured using 5 indicators, namely oral communication, written communication, social maturity, emotional maturity, and intellectual maturity. The research instrument used to measure a student's communication skills is an observation sheet of communication skills. For communication skills data before treatment, the highest score was 65, the lowest score was 40, the average score was 51.6 with very less predicate and the standard deviation was 8.2. Briefly, the distribution of communication skills data before treatment can be seen in Table 3

Table 3. Distribution Pretest Communication Capabilities

Value	f
40-44	8
45-49	9
50-54	7
55-59	5
60-64	4
65-69	3

Communication skills data after treatment obtained the highest value of 95 and the lowest value of 70. The average value of communication ability data after treatment is 82.8 with a standard deviation of 6.2. Briefly, the distribution of data dissemination of communication skills of class X MIA 2 students can be seen in Table 4.

Table 4. Distribution of Posttest Communication Capabilities

Value	f
70-74	2
75-79	8
80-84	14
85-89	8
90-94	2
95-99	2

The average grade of students' communication skills for each indicator before and after treatment can be seen through Figure 2..

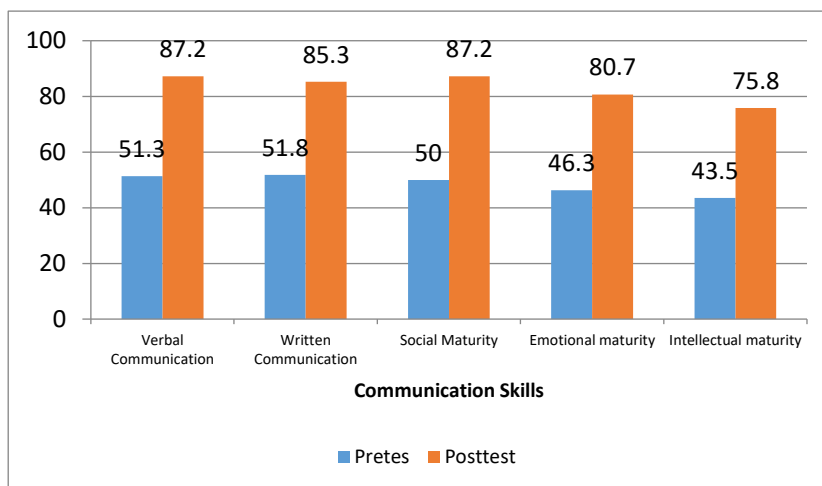


Fig. 2. Communication Skills Graph

From the graph, it can be seen that there is a difference between the average grades of students' science communication skills before and after treatment for each indicator of communication skills. In the graph above, the yellow diagram is the average value before the treatment, while the green diagram is the average value after the treatment.

Collaboration capability data obtained from measurements as stated above are analyzed using normality tests, homogeneity tests, and hypothesis tests. The normality test of collaboration capability values before treatment gets a Lo score of 0.144 and Lt of 0.148. Because $Lo < Lt$, the value of collaboration capabilities before treatment is declared normal distributed. Furthermore, the normality test of collaboration ability values after treatment and got a Lo value of 0.147 and Lt of 0.148. Because $Lo < Lt$, the value of collaboration capabilities after treatment is declared normal distributed. After the two data groups were declared normal distributed, a homogeneity test was conducted between the two data groups. The homogeneity test received Fh of 1.13 and Ft of 1.84. Therefore $Fh < Ft$, both data groups are declared homogeneous. The last step is the hypothesis test (t-test). From the t-test obtained th amounted to 336,842 and tt by 2,750. Therefore, because it $> tt$, it was concluded that there was a positive influence on the use of CTL-based learning videos on students' collaboration abilities.

Communication skills data obtained from measurements as stated above are analyzed using normality tests, homogeneity tests, and hypothesis tests. The normality test of communication ability values before treatment gets a Lo value of 0.146 and Lt of 0.148. Because $Lo < Lt$, the value of communication skills before treatment is declared normal distributed. Furthermore, a normality test was conducted for communication skills after treatment and received a Lo value of 0.092 and Lt of 0.148. Because $Lo < Lt$, the value of communication skills after treatment is declared normal distributed. After the two data groups were declared normal distributed, a homogeneity test was conducted between the two data groups. The homogeneity test received Fh of 1.75 and Ft of 1.84. Therefore $Fh < Ft$, both data groups are declared homogeneous. The last step is the hypothesis test (t-test). From the t-test obtained th by 80,128 and tt by 2,750. Therefore, $th > tt$, it was concluded that there was a positive influence on the use of CTL-based learning videos on students' communication skills.

The value of collaboration ability is obtained from observations made at the beginning and end of the study. Based on the research data above, the value of students' collaboration ability for each indicator after research is higher than the value of the ability to collaborate with each indicator before being given treatment on momentum and impulse material and simple harmonic vibrations. This is because several advantages are owned by the application of CTL-based learning videos using jigsaw-type cooperative learning models compared to previous learning that does not use CTL-based learning videos. CTL-based learning videos applied in the learning process of applying indicators can trigger an increase in students' science collaboration and communication skills.

The role of CTL-based learning videos on students' collaboration skills can be seen during the implementation of learning. In the learning carried out, students are divided into several groups. Students work into groups to discuss some of the cases featured in CTL-based learning videos. These cases are very close to the student's life. This attracts students to participate in discussions and give their arguments related to the cases discussed by the group. At the beginning of the meeting, not all students participated in the group discussion. However, at the next meeting, there was an increase in student interaction within their respective groups. With frequent participation and collaboration in solving problems, students can be increasingly trained to be able to collaborate well.

Data on science communication skills are obtained from observations made at the beginning and end of the study. The communication ability of science observed is only about matter momentum and impulses and simple harmonic vibrations. The study looked at the effect of using CTL-based learning videos using Jigsaw-type cooperative learning models on students' science communication skills. The value of students' general science communication skills after research is higher than the value of the ability to communicate before being given treatment on momentum and impulse material and simple harmonic vibrations. This is because there are several advantages of implementing CTL-based learning videos using jigsaw-type cooperative learning models compared to previous learning that does not use CTL-based learning videos.

The role of CTL-based learning videos on students' science communication skills can be seen during the implementation of learning. This learning video can help students to provide arguments related to the material. This is supported by the opinion of Busyaeri who said that the video of learning plays a role in developing the opinions and minds of students[13].

At the time of initial observation, students are more passive. There are only a few people who are active in learning. However, when this CTL-based learning video is shown, students seem enthusiastic about giving arguments regarding the video displayed. At the first meeting, researchers displayed judo martial arts videos to motivate students. Apparently, in the sample class, some students pursued judo martial arts so it seemed he was interested and began to argue. Furthermore, when researchers explained the material using the CTL approach, students who contributed actively increased. At the time, researchers linked the momentum and impulse material to something related to the student's talents and interests. For example, researchers have linked the law of conservation of momentum to long-barreled firearms commonly used by police. In this class, some students have the ambition to become police officers. So, during the discussion of the material students seem enthusiastic to follow it. Furthermore, at the time of group work, researchers displayed CTL-based videos to students. Researchers shared with students some of the cases in the CTL-based video for students to discuss. During the group discussion, almost all of the students gave their arguments. This is because the cases raised are things that they can meet in

everyday life. The more often students express their opinions both oral and written, then the communication skills of students will be honed.

This improvement in science communication skills is also helped by the use of jigsaw-type cooperative learning models. In this learning model, each member of the group has a different task. Next, each member of the group will explain the task it is a part of to the members of its group. This makes the whole student will talk during the learning. If students communicate more often, then the ability to communicate science is increasingly honed.

Based on theoretical studies, CTL-based learning videos can be used to improve students' abilities[14]. Based on this opinion, it is following the results of the study that the value of the ability to communicate the science of sample classroom students after the application of CTL-based learning videos is higher than the value of the ability to communicate the science of sample class students before applying CTL-based learning videos.

The obstacle that occurred in this study was inadequate networking during learning. CTL learning videos used are online learning videos. So to access CTL learning videos, an internet network is needed. However, at the time of the study, the network was in a state of inadequate in the area where the study was being held. This causes the duration of video playback to be longer. To play a video that lasts about 10 minutes takes up to 15 minutes. This resulted in the allocation of time that has been compiled in the RPP can not be achieved.

IV. CONCLUSION

The conclusions obtained from this study are as follows: (1) there is a positive influence on the use of CTL-based learning videos on the collaboration of students of Class X MIA Sma Negeri 1 Gido; (2) Second, there is a positive influence on the use of CTL-based learning videos on the science communication skills of students of Class X MIA SMA Negeri 1 Gido.

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