



ANALYSIS OF SCIENCE LITERACY SKILLS IN STAD (STUDENT TEAM ACHIEVEMENT DIVISION) MODEL ASSISTED BY ANIMATION VIDEO REVIEWED FROM CURIOSITY OF CLASS V STUDENTS

Agus Kharir¹, Budi Waluya², Suratinah³

^{1,3}Universitas Terbuka, Indonesia, ²Universitas Negeri Semarang, Indonesia

Email: muhammadnshfi@gmail.com, budiw@mail.unnes.ac.id, etin@ecampus.ut.ac.id

*Email for Correspondence:

ABSTRACT

Scientific literacy is essential for students, yet many struggle with low levels of these skills, highlighting the need for quality learning. This research aims to evaluate learning quality and analyze scientific literacy in relation to student curiosity within classes using the STAD model supported by animated videos. Employing a mixed-methods sequential exploratory design, the study involved planning, implementation, and assessment phases. Participants included students from the VA class as the experimental group and the VB class as the control group at MI Luqman Al Hakim Slawi. Instruments comprised scientific literacy test questions, curiosity questionnaires, and learning tools. Quantitative data were gathered through literacy tests, while qualitative data were collected via interviews, questionnaires, and documentation. Data analysis included assessing the validity and practicality of learning tools, implementation, and assessment results, alongside normality and homogeneity tests. The study found that the average validity of learning tools was 77%, practicality was 92%, and implementation reached 92.17%. Hypothesis testing revealed that students in the experimental group demonstrated more than 75% mastery in scientific literacy and exceeded the KKM average. Additionally, their average literacy abilities and improvements surpassed those of the control group. Furthermore, student curiosity positively influenced their scientific literacy. Qualitatively, students with high curiosity met all literacy indicators, while those with low curiosity failed to meet any. Overall, learning via the STAD model with animated videos significantly enhances students' scientific literacy skills.

Keywords:

Scientific Literacy,
STAD, Animation
Video, Curiosity

This is an open access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.

INTRODUCTION

PISA (Programme for International Student Assessment) organized by the OECD (Organization for Economic Cooperation and Development) has a vision that science education must be able to prepare students to understand science material, master science processes and use science in the context of real life, PISA's vision is known as the vision of science literacy (Al-Shibami et al., 2019; Arifin et al., 2014; Farid & Pratama, 2020; Pamara & Bayudhigantara, 2022). Referring to this, science literacy is an important component for a teacher in organizing a science learning process in the classroom. Teachers are an important factor that supports the success of the learning process, including supporting the success of students in improving their science literacy (Hordatt Gentles, 2018). Science learning that is held by paying attention to science literacy can improve the quality of learning and the quality of students. This is because science literacy does not just emphasize the transfer of knowledge from teachers to students. More than that, students will be directed to have knowledge that is not only factual, but also procedural and epistemic knowledge. In addition, students will also be honed in various science competencies, including explaining scientific phenomena, evaluating and designing research, and interpreting scientific data and evidence. Another domain developed in science literacy is related to students' attitudes towards science, which includes students' interest in knowledge and technology, environmental awareness, and conducting scientific research (Kelp et al., 2023; Ketut et al., 2022; Safrizal et al., 2022; Umar & Sukarno, 2022; Yuberti et al., 2022).

Science learning is aimed at fostering curiosity, developing the ability to ask questions, and find answers based on evidence, as well as developing scientific thinking skills. Science learning is not only fixated on concepts, but also provides direct experience in developing products, processes, scientific attitudes, and more broadly being able to master science literacy (Jufrida et al., 2019; Lin et al., 2024; Margunayasa et al., 2019).

The measurement of science literacy conducted by PISA puts Indonesia's position at a low position. One of the factors causing this is the lack of learning that is loaded with science literacy. In 2015, PISA scored 403 points for Indonesia. This is still below the ideal value set by PISA (Kelana & Pratama, 2019).

This is like what happened at Madrasah Ibtidaiyah Luqman Al Hakim (MI Luqman Al Hakim), Slawi District, Tegal Regency when the teacher was delivering material on "Relationships Between Living Things in Ecosystems". Based on the diagnostics of the results of the science literacy ability test in the material using a written test in the form of a description, it was obtained that the science literacy ability of students in class V of MI Luqman Al Hakim Slawi in the material was still low, as evidenced by 100% or 23 students getting a score below the KKM.

The following is an example of the answer of MI Lukman Al Hakim Slawi class V students for the 2024/2025 academic year on one of the question numbers given to evaluate the ability of science literacy in the basic competency "Analyzing the relationship between ecosystem components and food webs in the surrounding environment" which shows a low level of science literacy ability.

10. Sebutkan langkah-langkah apa saja yang dapat ditempuh untuk melindungi keanekaragaman hayati:
Jawab :
memelihara hewan di rumah

Figure 1.1 Sample Answer to the Science Literacy Test

Based on the students' answers, it is clear that the students made mistakes in answering the questions. This is because students are not able to explain phenomena scientifically, conclude the results of data analysis, give reasons for a phenomenon based on facts or events and find steps and decide on solutions to the given problems so that they cannot solve the problem properly.

The results of interviews with students showed that they did not like science learning, as seen from their low response and involvement during learning, as well as low curiosity shown by a lack of questions and interest in reading sources outside of textbooks. This is due to the lack of use of ICT-based media by teachers, so that students have difficulty understanding the material. Therefore, changes in the learning system are needed, including the selection of the right model. One of the models applied is STAD (Student Team Achievement Division), which can increase students' curiosity. In this model, learners are divided into diverse groups and work together to understand the material, thus supporting each other and helping each other. This model matches the characteristics of elementary school students who like to work in groups. In addition, the appropriate use of media, such as multimedia, is essential to increase students' motivation and understanding. Learning media can arouse interest, facilitate data interpretation, and present information in an interesting way, thus helping students better understand the material on "Relationships between Living Things in Ecosystems" and improving their science literacy.

The researcher believes that the "Animated Video" media is a suitable and appropriate medium to be used to support the achievement of this goal. Animated Video is one of the digital media that is useful for making presentations in the form of videos. The use of animated video media is also based on the paradigm that science learning is abstract because it includes science or in the form of relationships of living things that are difficult to explain by written language, so it will be easier to understand if there is visualization through animated videos. An explanation of problem-solving techniques, in this case a practicum on "Relationships between Living Beings in Ecosystems" which tends to be procedural or mechanistic, can be assisted by animation in animated videos so that students can more easily understand the flow of science literacy through the animated images. With this Animation Video media, teachers will be helped in explaining and instilling the concept of sequence rules or stages that lead students to science literacy so that students will certainly more easily accept and understand the teacher's explanation of the material.

In the world of education, achieving optimal academic outcomes requires curiosity from learners, which is considered essential for acquiring information, developing cognition, and building new relationships between ideas, perceptions, and concepts (Cacciola et al., 2013). Curiosity needs to be nurtured and developed in the learning process to encourage learners to be more interested and participate in activities that satisfy their curiosity, increase knowledge, and train skills (Mardhiyana & Sejati, 2016). Curiosity is also important in helping learners understand the phenomena around them and become more critical in searching for concepts (Mouromadhoni et al., 2019). The theory of curiosity put forward by Berlyne (1954) states that curiosity arises in response to dissatisfaction and uncertainty arising from new experiences. Curiosity serves as a motivator for learning and influences decision-making (Kidd & Hayden, 2015). Based on this, the researcher analyzed the science literacy ability in the STAD learning model assisted by animation videos reviewed from the curiosity of class V students of MI Luqman Al Hakim, with the research title "Analysis of Science Literacy Ability in the STAD Model Assisted by Animation Video Reviewed from Students' Curiosity." The purpose of this study is to test the quality of learning using the STAD model assisted by animated videos in improving science

literacy skills and analyzing science literacy skills reviewed from curiosity. This research is expected to contribute data on the quality of the model and open up opportunities for further research, as well as be useful for teachers in understanding the importance of science literacy related to students' curiosity, as well as providing new experiences for students in the STAD approach which is expected to improve their science literacy.

Science literacy among students remains critically low, especially in elementary education, as shown by national assessments and supported by specific findings from MI Luqman Al Hakim Slawi, where all students scored below the minimum competency criteria in ecosystem-related science material. Students demonstrate difficulty in explaining phenomena scientifically, drawing conclusions, and applying scientific reasoning. This situation highlights a pressing problem in current science instruction, which lacks engaging and inquiry-based models that effectively stimulate both cognitive and affective student domains, such as curiosity.

The urgency of this research stems from Indonesia's poor performance in international assessments like PISA, where science literacy scores remain significantly below the global average. This indicates that many students are not being equipped with the critical thinking and scientific reasoning skills necessary to thrive in a science-driven society. The core issue lies not just in curriculum content but in the pedagogical approach, which often fails to inspire curiosity or provide real-world context that resonates with learners.

Moreover, observations and diagnostic tests at MI Luqman Al Hakim reveal low student motivation and limited curiosity in science learning. This is exacerbated by the lack of technology-integrated teaching methods, such as animated videos, which could help visualize abstract concepts. Curiosity is an essential driver of inquiry and learning; thus, addressing it through well-structured, cooperative models like STAD (Student Team Achievement Division) combined with multimedia tools could significantly improve both engagement and learning outcomes.

Previous studies have consistently emphasized the role of curiosity in enhancing science education outcomes. For instance, Mardhiyana & Sejati (2016) highlighted that curiosity is fundamental in motivating students to ask questions, engage with new ideas, and develop scientific understanding. Similarly, Kidd & Hayden (2015) found that curiosity stimulates cognitive development and decision-making, making it a critical factor in educational success.

Research on the STAD model has shown that it can significantly improve academic performance and foster positive interdependence among students. This cooperative learning approach allows students to collaborate and support each other, which is ideal for the developmental stage of elementary learners. Studies by Slavin and colleagues have demonstrated that STAD improves not only academic achievement but also student engagement and social skills.

Furthermore, the integration of animation in science learning has been found to enhance comprehension of complex and abstract scientific phenomena. According to Noviyanto & Sumaryoto (2021)), animation helps visualize difficult concepts and increases student interest, particularly when aligned with cooperative strategies. Despite these findings, there is limited research examining the combined effect of the STAD model with animated videos in relation to students' curiosity, especially at the elementary level.

While studies exist on the STAD model, curiosity, and animation as separate variables in science education, few have explored the integrated impact of these three components—particularly how student curiosity influences science literacy outcomes within an animated STAD learning environment. This lack of integrative studies leaves a critical gap in understanding how affective and cognitive domains interact in multimedia-supported cooperative learning settings.

This study introduces a novel approach by analyzing science literacy through the lens of student curiosity using the STAD cooperative model enhanced with animated videos. Unlike prior studies that examined these elements in isolation, this research investigates their synergistic effects in elementary education, offering a comprehensive framework that merges inquiry-based learning, technology integration, and affective engagement.

The objective of this study is to evaluate the effectiveness of the STAD cooperative learning model supported by animated videos in improving science literacy skills among elementary students, while also analyzing how different levels of student curiosity influence these outcomes.

This research provides valuable insights for educators and policymakers in improving science instruction by demonstrating the importance of curiosity-driven and media-assisted cooperative learning. It supports the development of effective teaching strategies that not only elevate academic achievement but also cultivate long-term interest and engagement in science learning among young learners.

METHOD

The research design used in this study is Mixed Method Design, which is known as a mixed research approach that combines quantitative and qualitative methods, and has evolved since the 1980s to address more

complex research problems; In this study, the type applied is "The Exploratory Sequential Design", which begins with qualitative research to collect initial data followed by a quantitative approach to test or generalize based on initial findings. The research procedure is divided into two stages, namely the pre-field stage which includes the preparation of the research design, the selection of a research place at MI Luqman Al Hakim, the management of licensing, initial observation, and the preparation of research equipment involving the validation of learning tools, as well as the stage of field work which includes the implementation of initial tests, grouping students based on curiosity levels, the application of a STAD-type cooperative learning model, post-test administration, and interviews to interpret the results. This study uses quantitative data from science literacy ability tests and qualitative data from interviews and observations to get a more comprehensive picture. The study population consisted of class V students at MI Luqman Al Hakim, with the VA class as the experiment and the VB class as the control. The instruments used include science literacy ability tests, curiosity questionnaires, and observation sheets to assess the implementation of learning. The data collection procedure involved unstructured interviews, questionnaires, and documentation, while data analysis was carried out through normality, homogeneity, and various hypothesis tests to evaluate the difference in mean, proportion of completeness, and influence of curiosity on science literacy ability, as well as qualitative analysis to describe the results obtained from interview and observation data, with an emphasis on the validity and reliability of the data obtained.

RESULTS AND DISCUSSION (10 PT)

The Learning Quality of the Student Teams Achievement Division (STAD) Model with the Help of Animated Videos on Students' Science Literacy Skills

The learning quality of the Student Teams Achievement Division (STAD) model assisted by Animation Video was measured based on three stages, namely the planning stage, the implementation stage, and the assessment stage. The quality of learning is analyzed quantitatively and qualitatively. Quantitatively, learning is said to be quality if the data obtained at the planning stage in the form of validity tests of learning tools and research instruments are included in the minimum "good" category, and at the implementation stage in the form of observation of learning implementation is also included in the minimum "good" category and through the student response questionnaire the response is obtained in the minimum "good" category. At the assessment stage, it is analyzed quantitatively. Quantitatively, the learning of the Student Teams Achievement Division (STAD) model assisted by Animation Video is said to be of high quality if the assessment results of the final Student Science Literacy Ability Test reach learning completeness and are better than learning classes that use the Student Teams Achievement Division (STAD) model without the assistance of Animation Videos. The following are the results of the learning quality analysis as a result of research that has been conducted by researchers.

a. Learning Planning Stage

At this stage, what the researcher does is to prepare learning tools and research instruments that will be used in the learning process during the research. The measurement of learning quality at this stage was carried out by testing the validity of learning tools and research instruments. Learning tools and research instruments are said to be valid if the average score of each learning tool and research instrument from expert validators is in the category of "Good" or "Excellent". The validated learning tools include the Syllabus, Learning Implementation Plan (RPP), Teaching Materials, Student Worksheets (LKPD), and Science Literacy Test Questions. The validated research instruments include the Curiosity Questionnaire, the Curiosity Observation Sheet, the Science Literacy Ability Test Result Observation Sheet, the Student Response Questionnaire, the Teacher Response Questionnaire, the Interview Guidelines, and the Animation Video Media Description. The validation of learning tools and research instruments aims to assess the extent to which the feasibility of learning tools and research instruments can be used in the learning process during the research. The learning tools and research instruments that have been made are then validated by expert validators totaling four people, namely Supervisor I (Prof. Dr. ST. Budi Waluya, M.Si.), Science Material Expert (Dr. Sutardi, M.Pd.), School Supervisor (Alimi, M.Pd.), and Media Expert (Pratomo, M.Cs.). The scores of expert validators refer to a scale of 1 to 5. The assessment results of the expert validators are analyzed based on the average score results given by the expert validator. The value of the expert validator on the learning instrument is shown in the following table 4.1.

Table 4.1 Recap of Instrument Validation 1

Learning	Value of Validator				Sum	Grade Point	Category
Instruments	I	II	III	IV		Average	
Syllabus	4,00	3,58	4,50	3,67	15,75	3,94	Good
RPP	4,33	3,62	3,76	3,67	15,38	3,85	Good
Bahan Ajar	4,10	3,40	3,50	4,30	15,30	3,83	Good
LKPD	4,30	3,80	3,50	4,20	15,80	3,95	Good

Science Literacy Test Questions	3,70	3,70	3,80	3,60	14,80	3,70	Good
---------------------------------	------	------	------	------	-------	------	------

Based on the scores from expert validators on learning instruments, an average score of 3.94 for the syllabus was obtained, the average score for the lesson plan was 3.85; the average score for teaching materials is 3.83; The average score for LKPD is 3.95 and the average score is 3.70 for science literacy test questions. The conclusion is that the average score of the expert validator on the learning instrument was obtained with an average score of $3.854 = 77\%$ so that it was stated in the category of "Good". This means that the learning instrument can be said to be valid and suitable for use in this research process. The expert validator's assessment of the research instrument is in table 4.2 below.

Table 4.2 Penel Instrument Validation Recap 1

Research Instruments	Value of Validator				Sum	Grade Point Average	Category
	I	II	III	IV			
Angket <i>Curiosity</i>	3,60	3,40	3,60	4,20	14,80	3,70	Good
Curiosity Observation Sheet	3,90	4,00	3,80	4,00	15,70	3,93	Good
Science Literacy Ability Test Results Observation Sheet	3,50	3,75	3,75	4,00	15,00	3,75	Good
Learning Implementation Observation Sheet	3,29	3,43	3,57	3,71	14,00	3,50	Good
Student Response Questionnaire	3,17	3,33	3,50	4,00	14,00	3,50	Good
Teacher Response Questionnaire	4,00	3,57	4,00	3,71	15,28	3,82	Good
Interview Guidelines	3,75	3,50	3,50	3,50	14,25	3,56	Good
Description of Animated Video Media	4,00	3,35	3,48	3,57	14,39	3,60	Good

Based on the value of the expert validator on the research instrument, an average score of 3.70 was obtained for the curiosity questionnaire, the average score was 3.93 for the curiosity observation sheet, the average score for the observation sheet for the results of the science literacy test was 3.75; The average score for the student response questionnaire was 3.50; The average score of the teacher's response questionnaire was 3.82; The average score was 3.56 for the interview guidelines, and the average score was 3.60 for the description of animated video media. So it can be concluded that the average score of the expert validator on the research instrument is $3.67 = 75\%$ so that it is included in the "Good" category so that the research instrument that has been made by the researcher can be said to be valid and feasible to be used in the learning process during the research. The following is an analysis of the results of the instrument test questions for science literacy ability.

Results of Calculation of Validity of Question Items

Testing the validity of research instruments on science literacy ability test questions using the formula of product moment coefficient (Product Moment) with a rough number (Arikunto, 2021).

$$r_{xy} = \frac{n(\sum XY) - (\sum X)(\sum Y)}{\sqrt{(n\sum X^2 - (\sum X)^2)(n\sum Y^2 - (\sum Y)^2)}}$$

Information:

r_{xy} = correlation coefficient between variables X and Y

n = number of trial respondents

$\sum X$ = the total score of each item

AND = total score of all test respondent items

$\sum XY$ = the sum of the multiplication of each item's score by the score of all test respondent items

$\sum X^2$ = the sum of the squares of each item's score

$\sum Y^2$ = the square number of the score of all test respondent items

Test Results:

If the calculation $> r_{table}$ is at a significant level of 5%, then the item of the instrument is valid.

The science literacy test question instrument that has been made by the researcher was tested on 30 students in the VC class of MIT Luqman Al Hakim Slawi. The recapitulation of the results of the validity of each question item can be seen in the appendix of this research report.

Based on the calculation of the validity of the question items, it can be stated that all the ten question items that have been tested are all valid so that they can be used in this study.

Results of Reliability Calculation of Question Items

Good test questions must also have high reliability. Reliability means the reliability, trust, or consistency of the ability of the test questions if used to test the same respondent many times. The reliability calculation formula is as follows (Arikunto, 2018).

Analysis of Science Literacy Skills in STAD (Student Team Achievement Division) Model Assisted by Animation Video Reviewed from Curiosity of Class V Students

$$r_{11} = \frac{k}{k-1} / 01 - \frac{\sum \sigma_i^2}{\sigma_t^2} 3$$

Information:

r_{11} = instrument reliability

k = many questions

$\sum p_i^2$ = the number of variances of the instrument item/the number of score variants of each question

p_t^2 = total variance

Test Results:

If $r_{hitung} > r_{tabel}$ at the product moment with a significant level of 5%, then the item of the instrument is said to be reliable.

Based on the results of the calculation of the reliability of the question items, the science literacy test showed a score of 0.768 so that it was included in the "High" category, which means that the question items that have been created are good to be used in this study as a tool to measure the quality of learning of the Student Teams Achievement Division (STAD) learning model assisted by Video Animation.

Difficulty Level Calculation Results

Questions are considered good if they have a moderate level of difficulty, which is not too difficult and not too easy. The difficulty index range is between 0.000-1.00. A question that has a difficulty index of 0.00 indicates that the question is difficult. Meanwhile, the question that has a difficulty index of 1.00 shows that the question is too easy. The difficulty index formula is as follows.

$$Mean = \frac{\text{Total student's score on the question}}{\text{Total students attending the test}} \quad \text{mean}$$

$$TK(\text{Tingkat Kesukaran, Level of Difficulty}) = \frac{\text{Maximum score}}{\text{Maximum score}}$$

Based on the results of the calculation of the difficulty level of the question items, the ten questions that have been tested are included in the easy, medium, and difficult categories (the distribution is complete) so it can be said to be suitable for use in this study.

Differential Power Calculation Results

The distinguishing power of test questions is the ability of questions to distinguish between high, medium, and low ability students. Numbers show the amount of discriminating power is called the discrimination index or abbreviated as D. Questions that can be answered both by students who have high and low abilities mean that the question is not feasible, because it does not have discriminating power. So a good question is a question that can distinguish high, medium, and low-ability students. The formula for differentiating power is as follows.

$$D = \frac{M_A - M_B}{\text{Maximum score}}$$

Information:

M_A = average score of the top group

M_B = average bottom group score

Based on the calculation of the differentiating power of the question item, the question item that has been tested is included in the category of "Very Good" in its differentiating power so that it can be said to be suitable for use in this study.

In the following, we present in full the validity, reliability, level of difficulty and differentiation of the items of the science literacy ability test questions that will be used in the research in table 4.3 below.

Table 4.3 Recap of Validity, Reliability 1 Recap of Validity, Reliability, Level of Difficulty and Differentiating Power

Question Item Number	Validity			Reliability		Difficulty Level		Differentiating Power	
	rx,y	rtable	Criterion	R11	Criterion	Score	Criterion	Score	Criterion
1	0.7224	0.361	Valid	0.768	Tall	0.600	Keep	0.213	Excellent
2	0.6016	0.361	Valid			0.680	Keep	0.267	Excellent
3	0.5251	0.361	Valid			0.813	Easy	0.08	Excellent
4	0.6060	0.361	Valid			0.607	Keep	0.253	Excellent
5	0.7266	0.361	Valid			0.613	Keep	0.267	Excellent
6	0.5708	0.361	Valid			0.767	Easy	0.12	Excellent
7	0.6143	0.361	Valid			0.224	Criticism	0.12	Excellent
8	0.5435	0.361	Valid			0.593	Keep	0.173	Excellent
9	0.4903	0.361	Valid			0.260	Criticism	0.28	Excellent
10	0.3984	0.361	Valid			0.560	Keep	0.133	Excellent

b. Learning Implementation Stage

At the implementation stage, the measurement of the quality of the Student Teams Achievement Division (STAD) learning model assisted by Animation Video was carried out by carrying out observations on the implementation of learning by providing student response questionnaires and teacher response questionnaires. The measurement of learning implementation is seen from the observation sheet of learning implementation and the measurement of student responses and teachers' responses to learning are seen from student responses and teacher responses. Learning is said to be of high quality if the results of observation of

Analysis of Science Literacy Skills in STAD (Student Team Achievement Division) Model Assisted by Animation Video Reviewed from Curiosity of Class V Students

the implementation of learning are in the minimum category of "Good", the results of the student response questionnaire are obtained with a minimum response of "Good" and the results of the teacher's response questionnaire are obtained with a response in the minimum category of "Good".

The implementation of the Student Teams Achievement Division (STAD) learning model assisted by Animation Video was carried out during seven meetings for the material "The Relationship of Living Things in Ecosystems". Each observer meeting observes the teacher's activities during the learning process based on the observation sheet of the implementation of learning. The observer who observed the implementation of learning was Mr. Agus Kharir as well as a researcher.

The results of the assessment from the observer were analyzed based on the average score. A summary of the results of the observer's assessment of the implementation of learning is in table 4.4 below.

Table 4.4 Recap of PBM Implementation Score 1

Meeting	Acquisition Score	Value	Percentage	Category
First	87	4,35	87%	Excellent
Second	88	4,40	88%	Excellent
Third	89	4,45	89%	Excellent
Fourth	92	4,60	92%	Excellent
Fifth	95	4,75	95%	Excellent
Sixth	98	4,90	98%	Excellent
Seventh	100	5,00	100%	Excellent

Based on the table above, it can be seen that the results of observation on the implementation of science learning using the Student Teams Achievement Division (STAD) learning model assisted by Animation Videos on the material "The Relationship of Living Beings in the Ecosystem", the implementation of learning in the first meeting was very good with the level of implementation of the learning process from all aspects of 87%, but in the first meeting the researcher still adjusted the conditions of the students with new learning applied in the classroom.

The implementation of learning for each meeting has improved well from the second meeting to the fourth meeting compared to the first meeting. The success rate reaches up to 100% at the last meeting. This is because students and teachers have been able to adjust to the newly implemented Student Teams Achievement Division (STAD) learning model assisted by Animation Videos. Overall, the researcher has carried out a series of learning activities by previously reflecting on the shortcomings during the learning activities. So that each meeting shows an increase in the achievement of all aspects observed because students and researchers have been able to adjust to the new learning process.

The quality of the Student Teams Achievement Division (STAD) learning model assisted by Animation Video was also measured based on the results of the student response questionnaire. The recapitulation of the results of the student response questionnaire shows the level of student response at an average score of 109 out of a maximum score of 120 or 91% so that it is included in the "Very Good" category. For a complete analysis of the results of the student response questionnaire, it can be seen in the appendix of this research report.

The results of the teacher's response questionnaire on the Student Teams Achievement Division (STAD) learning model assisted by Animation Video can also be seen in the appendix of this research report. Based on the analysis conducted by the researcher, the results of the teacher's response questionnaire obtained a score of 111 out of a maximum score of 120. This means that the achievement of the percentage of teacher response questionnaires is 93% so that it is included in the "Very Good" category.

Learning Assessment Stage

The quality of learning in the Student Teams Achievements Division (STAD) Animation Assisted learning model is also based on learning assessment.

Initial Data Analysis

The researcher carried out initial data analysis based on the value of the initial science literacy ability test. Then the list of initial science literacy ability test scores will be carried out as a normality test, a homogeneity test, and an initial average similarity test.

Normality Test

The normality test was carried out to determine whether the data in the initial state was distributed normally or not. This study conducted a data normality test using the Kolmogorov-Smirnov Test with the help of SPSS 25. The hypotheses to be tested are as follows.

H_0 : $\text{sig} > 0.05$ (Data from a normally distributed population)

H_1 : $\text{sig} \leq 0.05$ (Data from a population that is not normally distributed)

The following is a display of the results of the normality test using SPSS 25 on the results of the initial science literacy ability test for the control class and the experimental class.

Tests of Normality							
		Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Kelas	Statistic	df	Sig.	Statistic	df	Sig.
Nilai	Kelas Kontrol	.168	24	.077	.958	24	.408
	Kelas Eksperimen	.101	23	.200*	.963	23	.535

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Using SPSS 25 test criteria using a significance level of 5%. Acceptance H_0 if $\text{sig} > 0.05$ means that the data comes from a normally distributed population (Kadir, 2015). Based on calculations with the help of the SPSS 25 program using the Kolmogorov-Smirnov Test, a significance value = $0.077 = 7.7\% > 5\%$ was obtained for the control class, while in the experimental class, a significance value of $0.200 = 20\% > 5\%$ was obtained so that H_0 was accepted. This means that the sample comes from a normally distributed population.

Homogeneity Test

The homogeneity test was carried out to find out whether the sample group had the same variance or not. The data used to test the homogeneity of the initial data is the data from the initial science literacy ability test. The hypotheses to be tested are as follows.

$H_0 : \sigma_1^2 = \sigma_2^2$ (Population variance is homogeneous)

$H_1 : \sigma_1^2 \neq \sigma_2^2$ (Population variance is not homogeneous)

Information:

σ_1^2 : Variance of experimental classes

σ_2^2 : Control class variance

This study tested homogeneity with the Levene Test using the SPSS 25 program. The criteria for testing the hypothesis are H_0 accepted if the p-value ($\text{sig} > 0.05$) (Kadir, 2015). The following is a look at the homogeneity test conducted by the researcher on the SPSS 25 application.

Test of Homogeneity of Variances

Value		Levene Statistic	df1	df2	Sig.
Based on Mean		.286	1	45	.595
Based on Median		.352	1	45	.556
Based on Median and with adjusted df		.352	1	44.310	.556
Based on trimmed mean		.271	1	45	.606

Based on the Lavene Test through SPSS 25, a significance value of $0.595 > 0.05$ was obtained, which means that H_0 accepted, the population variance is homogeneous so that the researcher can carry out the next test activity according to the research stage.

Initial Mean Similarity Test

The purpose of this test is to find out if the experimental class and the control class have the same initial capability. The data used to find out the initial average similarity is the data from the science literacy ability test results. The statistical hypothesis of the appeal test is as follows.

$H_0 : \mu_1 = \mu_2$ (The average initial science literacy ability of students in both classes is the same)

$H_1 : \mu_1 \neq \mu_2$ (The average initial science literacy ability of students in both classes is not the same)

Information:

μ_1 : Average initial science literacy ability of experimental class

μ_2 : Average initial science literacy ability of the control class

In this study, the similarity test was carried out with 2 sample T tests using SPSS 20. The criteria for testing the hypothesis is H_0 accepted if p-value > 0.05 means that the average of the two groups is the same (Kadir, 2015). The following are the results of the initial average difference test using SPSS 25 that has been carried out by the researcher.

Independent Samples Test									
Levene's Test for Equality of Variances					t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference
Nilai	Equal variances assumed	.286	.595	-.248	45	.805	-.71377	2.88222	-6.51886 5.09132
	Equal variances not assumed			-.248	45.000	.805	-.71377	2.87937	-6.51311 5.08558

Based on the results of the test using SPSS 25, a significance value of $0.805 > 0.05$ was obtained, which means that the average of the control class and the experimental class was the same so that the researcher could use the selected sample.

Final Data Analysis

Final Data Prerequisite Test

The researcher analyzed the final data based on the final science literacy test score (post test score). For the final data prerequisite test, a normality test and a homogeneity test will be carried out first on the final data.

1) Final Data Normality Test

The normality test is carried out to find out whether the data in the final state is normally distributed or not, namely by using post test data. This study conducted a data normality test using the Kolmogorov-Smirnov Test with the help of SPSS 25. The hypotheses to be tested are as follows.

H_0 : $\text{sig} > 0.05$ (Normal distributed post test data)

H_1 : $\text{sig} \leq 0.05$ (Post test data is not normally distributed)

The following is a display of the normality test results using SPSS 25 on the results of the final science literacy test for the control class and the experimental class.

Tests of Normality							
	Class	Kolmogorov-Smirnova			Shapiro-Wilk		
		Statistic	Df	Sig.	Statistic	Df	Sig.
Value	Control Class	.132	24	.200 ^a	.955	24	.342
	Experimental Classes	.148	23	.200 ^a	.901	23	.026

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Using SPSS 25 test criteria using a significance level of 5%. Acceptance H_0 if $\text{sig} > 0.05$ means that the data comes from a normally distributed population (Kadir, 2015). Based on calculations with the help of the SPSS 25 program using the Kolmogorov-Smirnov Test, a significance value = $0.200 = 20\% > 5\%$ was obtained for the control class, while in the experimental class, a significance value of $0.200 = 20\% > 5\%$ was obtained so that it was H_0 accepted. This means that the post test data is distributed normally.

2) Final Data Homogeneity Test

The homogeneity test was carried out to find out whether the sample group had the same variance or not. The data used to test the homogeneity of the final data is the data from the final science literacy test (post test score). The hypotheses to be tested are as follows.

H_0 : $[p_1]^2 = [p_2]^2$ (The variance of post test data is homogeneous)

H_1 : $[p_1]^2 \neq [p_2]^2$ (The variance of post test data is not homogeneous)

Information:

$[p_1]^2$: Variance of experimental classes

$[p_2]^2$: Control class variance

This study tested homogeneity with the Levene Test using the SPSS 25 program. The criteria for testing the hypothesis are H_0 accepted if the p-value ($\text{sig} > 0.05$) (Kadir, 2015). The following is a look at the homogeneity test conducted by the researcher on the SPSS 25 application.

Test of Homogeneity of Variances					
Value		Levene Statistic		df1	df2
					Itself.
	Based on Mean	.103	1	45	.750
	Based on Median	.021	1	45	.885
	Based on Median and with adjusted df	.021	1	44.788	.885
	Based on trimmed mean	.090	1	45	.766

Based on the Lavene Test through SPSS 25, a significance value of $0.750 > 0.05$ was obtained, which means that H_0 accepted, namely the post test data is homogeneous so that the researcher can carry out the next test activity, namely conducting a hypothesis test.

1. Uji Hypothesis

a. Average Completeness Test of Science Literacy Ability (Hypothesis Test 1)

The average completeness test of science literacy ability was used to determine the achievement of students' science literacy skills in the experimental class (STAD model learning class assisted by Animation Video) material on the Relationship of Living Things in Ecosystems with a score of 75. A score of 75 is the Minimum Completeness Criterion (KKM) for the basic competencies of science materials in this study.

The average completeness test uses a one-party t-test, namely the right party. The statistical hypothesis is as follows.

H_0 : $\mu \leq 75$ (The average science literacy ability of students in the STAD model learning class assisted by Animation Video is less than or equal to 75)

H_1 : $\mu > 75$ (The average science literacy ability of students in the STAD model learning class assisted by Animation Video is more than 75)

The formula used is as follows (Budiyo, 2016) in (Sukestiyarno, 2020).

$$t = \frac{\bar{x} - \mu_0}{\frac{s}{\sqrt{n}}}$$

Information:

t = calculated t-value

s = sample standard deviation

n = number of sample members

$\bar{x}$ = average score of science literacy ability in experimental classes

m_0 = hypothesized value (KKM) which is more than 75

The hypothesis testing criterion is H_0 rejected if the $t_{count} \geq t(1-\alpha)(n-1)$, with $t(1-\alpha)(n-1)$ is obtained from the list of distributions t with odds $(1-\alpha)$ and $dk = n-1$. In other cases H_0 rejected. Based on the analysis of the final data obtained from the post test score, the researcher obtained the results as presented in table 4.5 below.

Table 4.5 Results of the Analysis of the Average Completeness Test of Science Literacy Ability

Class Type	$\bar{x}$	$\square\square$	s	$\sqrt{n}$	t_{table}	t_{count}
Control Class	81.083	75	9.564	4.899	1.714	3.11606
Experimental Classes	90.000	75	8.821	4.798	1.717	8.15482

From the data in the table above, the results of t calculation were obtained of $3.11606 > 1,714$ in the control class and t calculation of $8.15482 > 1,717$ so that H_0 rejected which means that the average science literacy ability in the control class and the experimental class is already above the value of 75 or is already above the KKM (Minimum Completeness Criteria) so that it can be stated that the average science literacy ability in the control class and the experimental class is declared complete.

Classical Completeness Test (Hypothesis Test 2)

The classical completeness test of learning using the STAD learning model assisted by Animation Video was used to determine the success of students in the classroom who could achieve more than 75% of KKM. The formula for the classical completeness hypothesis is as follows.

H_0 : $\square \leq 75\%$ (The proportion of students' completeness in learning the STAD learning model assisted by Animation Video is less than 75%)

H_1 : $\square > 75\%$ (The proportion of students' completeness in learning the STAD learning model assisted by Animation Video is more than 75%)

The test uses z statistics with the following formula (Budiyo, 2016).

$$z = \frac{\frac{\bar{x} - \pi_0}{\frac{\pi_0(1 - \pi_0)}{n}}}{\frac{\pi_0(1 - \pi_0)}{n}}$$

Information:

z = calculated z -value

x = the number of students who completed individually in the experimental class

n = number of students in the experimental class

$\square_0$ = a hypothetical value (KKM) which is more than 75% of the total number of students in the KKM completed class

Significance determination = $\alpha = 0.05$.

The test criteria are based on the results of the calculation of the z value compared to the z value of the table with $\alpha = 0.05$ so that H_0 rejected if it is $z_{hitung} \geq z_{(0.5-\alpha)}$. This means that the proportion of students' completeness in STAD learning assisted by Animation Videos is more than 75% (Sukestiyarno, 2014). The following are the results of the analysis of post test scores on the completeness of individuals classically of students. Pay attention to the analysis below.

$x = 22$

$n = 23$

$\square_0 = 75\% = 0.75$

z_{table} is obtained from $0.5 - 0.05 = 0.45$

Z_{count} 2.28733

Z_{table} 0.6736

The above numbers are then entered into the formula and get a calculation result of $2.28733 > 0.6736$. Because the $>$ of the z_{table} , H_0 is rejected, which means that the proportion of students' completeness in learning STAD assisted by Video Animation (experimental class) is more than 75% so that it can be concluded that the science literacy ability of students in the experimental class has been completed.

Test of the Difference in the Average Science Literacy Ability of Students (Hypothesis Test 3)

This test is used to compare and determine the difference in the average science literacy ability of students in the experimental class and the control class. To test this, use a right-party t -test with the following statistical hypothesis.

$H_0 : \mu_1 \leq \mu_2$ (The average score of science literacy ability of the experimental class is less than or equal to that of the control class)

$H_1 : \mu_1 > \mu_2$ (Average score of science literacy ability of the experimental class more than the control class)

Hypothesis testing uses the following formula (Budiyo, 2016).

$$t = \frac{x_1 - x_2}{s \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

By using the formula s as follows.

$$s^2 = \frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}$$

Information:

x_1 = Average science literacy ability test of experimental class students

x_2 = Average science literacy ability test of control class students

s^2 = Combined variance

$[s_1]^2$ = Variance of science literacy test score in experimental class

$[s_2]^2$ = Variance of the test scores of the science literacy ability test of the control class

n_1 = Number of students in the experimental class

n_2 = Number of students in the control class

In this test, the test criterion is H_0 accepted if $t_{hitung} < t_{(1-\alpha)}$, where $t_{(1-\alpha)}$ is obtained from the distribution list t with $dk = n_1 + n_2 - 2$ and probability $(1-\alpha)$. The average difference test can be used SPSS 25, namely with an Independent Sample T-Test with the criteria H_0 rejected if p-value (sig) < 0.05 and H_1 is accepted if p-value > 0.05 (Sukestiyarno, 2020). This means that the average score of science literacy ability in the experimental class is better than that of the control class. Here are the test results based on the formula mentioned above. Take a look at the table below.

1	2	s2	N1 - 1	s12	s22	N2 - 1	n1	n2	S	Stuttgart	Table
90.00	81.08	84.7963	22	77.8182	91.471	23	23	24	9.20849	3.31845	2.014103

Ket. : t_{table} di gets from $dk = 23 + 24 - 2 = 45$ with $\alpha = 0.05$

Based on the table mentioned above, a t_{hitung} of 3.31845 was obtained > t_{table} 2.014103 which means that H_0 rejected and H_1 was accepted so that it was concluded that the average value of science literacy ability in the experimental class was more than that of the control class.

Test of the Difference in the Proportion of Completeness of Students' Science Literacy Ability (Hypothesis Test 4)

The difference in proportion test was used to determine the difference in the number of students who achieved the completeness of science literacy skills in the experimental class and the control class. The statistical hypothesis for the difference in proportion test is as follows.

$H_0 : \pi_1 \leq \pi_2$ (The proportion of students' science literacy ability completeness in the experimental class is less than the same as the control class)

$H_1 : \pi_1 > \pi_2$ (The proportion of students' completeness of science literacy skills in the experimental class is greater than the control class)

The statistical test formula used in this study is as follows (Budiyo, 2016).

$$z = \frac{\pi_1 - \pi_2}{\sqrt{p \cdot q \cdot \left\{ \left(\frac{1}{n_1} + \frac{1}{n_2} \right) \right\}}}, \text{ with and } \hat{p} = \frac{x_1 + x_2}{n_1 + n_2} \text{ and } q = 1 - \hat{p}$$

Information:

with = Calculated t-value

x_1 = The number of students in the experimental class who completed the experiment

x_2 = Number of students in the control class who completed

n_1 = Number of students in the experimental class

n_2 = Number of students in the control class

p_1 = Proportion of experimental classes

p_2 = Proportion of control class

This test uses a significance level of $\alpha = 0.05$. The test criteria is H_0 rejected if $z \geq z_{(0.5-\alpha)}$. This means that the proportion of students' science literacy skills in the experimental class is greater than that of the control class.

The following are the results of the analysis of post test scores on the proportion of completeness of students' science literacy skills. From the post test data, it can be analyzed as shown in table 4.6 below.

Table 4.6 Analysis of the Proportion of Completeness of Science Literacy Ability

$\square I$	$\square \square$	$x1$	$x2$	$N1$	$N2$	$\hat{p}$	$\hat{q}$	z_{count}	z_{table}
-------------	-------------------	------	------	------	------	-----------	-----------	-------------	-------------

Interdisciplinary Social Studies	23	23	24	0.85106	0.14894	1.98795	0.6736489
----------------------------------	----	----	----	---------	---------	---------	-----------

Based on the analysis of post test data, a z value of $1.98795 > 0.6736$ was obtained so that H_0 was rejected so that it can be concluded that the proportion of completeness of students' science literacy skills in the experimental class was greater than the proportion of completeness of students' science literacy skills in the control class.

Average Test of Improvement of Science Literacy Ability (Hypothesis Test 5)

The improvement test is used to find out the extent of improvement in science literacy skills before and after learning. The hypothesis used to determine the average increase is as follows.

$H_0 : \mu_{(g_1)} \leq \mu_{(g_2)}$ (Average increase in science literacy ability in the experimental class was less than that of the control class)

$H_1 : \mu_{(g_1)} > \mu_{(g_2)}$ (Average increase in science literacy ability of the experimental class more than the control class)

The formula used to calculate the average increase in students' science literacy ability is to use normalized gains. According to Hake as written in (Nani & Kusumah, 2015) the normalized gain can be calculated with the following formula.

$$\text{Gain ternormalisasi } (g) = \frac{\text{Skor Postes} - \text{Skor Pretes}}{\text{Skor Maksimum Ideal} - \text{Skor Pretes}}$$

The gain index criteria according to Hake can be seen in the following table.

Table 4.7 Gain Index Criteria 1

Gain Index	Criterion
$g \geq 0,7$	Tall
$0,3 \leq g < 0,7$	Keep
$0,3 < g$	Low

The test criteria are H_0 accepted if $\mu_{(g_1)} \leq 0.7 \geq \mu_{(g_2)}$ and others are rejected. This means that the average increase in science literacy ability in the experimental class is more than that of the control class. In this study, the maximum score is ideally 100.

Based on calculations, a value of g_1 of 0.8685 > g_2 is 0.74154 so that H_0 is rejected, which means that the average increase in science literacy ability of students in the experimental class is more than that of the control class. The average increase in students' literacy ability in both the control class and the experimental class was included in the "High" category. Based on this, it can be concluded that the average increase in students' science literacy skills in the experimental class is greater than in the control class.

Simple Regression Test of the Influence of Curiosity on Science Literacy Ability (Hypothesis Test 6)

Students' curiosity quantitatively is by providing a curiosity questionnaire with the aim of seeing an increase in students' curiosity after the implementation of the STAD learning model assisted by Animation Videos.

The data obtained from the results of filling in students' curiosity before and after learning was then analyzed to determine the increase in the curiosity of students in the control class and the experimental class. Data analysis was carried out using statistical tests on the initial score and final score of the students' curiosity questionnaire with the help of the SPSS 25 application. The results of the statistical test are as follows.

Normality Test

This test uses the Kolmogorov-Smirnov test with the test hypothesis as follows.

$H_0 : \text{sig} > 0.05$ (Initial curiosity data from a normally distributed population)

$H_1 : \text{sig} \leq 0.05$ (Initial curiosity data did not come from a normally distributed population)

The test is H_0 accepted if the $\text{sig} > 0.05$, i.e. the initial curiosity data comes from a normally distributed population.

The following is a display of the results of the normality test analysis of the initial score results of the students' curiosity questionnaire displayed by SPSS 25.

Tests of Normality							
	Class	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Itself.	Statistic	Df	Itself.
Shoes	Control Class	.166	24	.087	.927	24	.082
	Experimental Classes	.164	23	.110	.901	23	.027

a. Lilliefors Significance Correction

Based on the results of the normality test of the initial curiosity score of students with the help of the SPSS 25 application using the Kolmogorov-Smirnov test, the significance value of the control class was $0.087 > 0.05$ and the significance of the experimental class was $0.110 > 0.05$ which means that H_0 was accepted which means that the sample came from a normally distributed population. So it can be concluded that the initial scores of the students' curiosity questionnaire results are distributed normally. The researcher conducted a normality test on the final score results of the students' curiosity questionnaire. The following is a display of

the results of the normality test analysis of the final score of the students' curiosity questionnaire results displayed by the SPSS 25 application.

Tests of Normality							
	Class	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Itself.	Statistic	df	Itself.
Shoes	Control Class	.119	24	.200	.963	24	.506
	Experimental Classes	.167	23	.096	.899	23	.025

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Based on the results of the normality test, the final score of the students' curiosity questionnaire results with the help of the SPSS 25 application using the Kolmogorov-Smirnov test obtained a significance value of the control class of $0.200 > 0.05$ and the significance of the experimental class of $0.096 > 0.05$ which means that H_0 is accepted, which means that the sample comes from a normally distributed population. So it can be concluded that the final score of the students' curiosity questionnaire results is distributed normally.

Homogeneity Test

The homogeneity test was carried out to find out whether the sample group had the same variance or not. The data used to test the homogeneity of the initial data is the initial and final score data of the results of the students' curiosity questionnaire. The hypotheses to be tested are as follows.

H_0 : $[p_1]^2 = [p_2]^2$ (Population variance is homogeneous)

H_1 : $[p_1]^2 \neq [p_2]^2$ (Population variance is not homogeneous)

Information:

$[p_1]^2$: Variance of experimental classes

$[p_2]^2$: Control class variance

This study tested homogeneity with the Levene Test using the SPSS 25 program. The criteria for testing the hypothesis are H_0 accepted if the p-value (sig) >0.05 (Kadir, 2015). The following is a look at the homogeneity test conducted by the researcher on the SPSS 25 application. The following is a display of the results of the homogeneity test analysis on the initial score of the students' curiosity questionnaire results displayed by the SPSS 25 application.

Test of Homogeneity of Variances				
		Levene Statistic		Itself.
		df1	df2	
Shoes	Based on Mean	.373	1	.545
	Based on Median	.312	1	.579
	Based on Median and with adjusted df	.312	43.914	.579
	Based on trimmed mean	.378	1	.542

Based on the results of the homogeneity test, the initial score of the students' curiosity questionnaire results with the help of the SPSS 25 application using the Lavene-Test test obtained a significance value of $0.545 > 0.05$ so that H_0 was accepted, which means that the sample came from a homogeneous population. So it can be concluded that the final score of the students' curiosity questionnaire results is homogeneous. The following is a display of the results of the homogeneity test analysis of the final score of the students' curiosity questionnaire results displayed by the SPSS 25 application.

Test of Homogeneity of Variances				
		Levene Statistic		Itself.
		df1	df2	
Shoes	Based on Mean	1.024	1	.317
	Based on Median	1.043	1	.313
	Based on Median and with adjusted df	1.043	37.555	.314
	Based on trimmed mean	1.038	1	.314

Based on the results of the homogeneity test, the final score of the students' curiosity questionnaire results with the help of the SPSS 25 application using the Lavene-Test test obtained a significance value of $0.317 > 0.05$ so that H_0 was accepted, which means that the sample came from a homogeneous population. So it can be concluded that the final score of the students' curiosity questionnaire results is homogeneous.

c. Regression Linearity Test

The regression linearity test was used to see the regression linearity with a model used on the students' science literacy ability reviewed from the students' curiosity. The hypotheses to be tested are as follows.

H_0 : The model is a non-linear regression

H_1 : The model is a linear regression

The test criterion is that H_0 is rejected if $F_{\text{calculate}} > F_{(\alpha)(1 \cdot n-2)}$ where $F_{(\alpha)(1 \cdot n-2)}$ is obtained from the list of distributions F with the decimal $dk = 1$ and the dk of the denominator $= n-2$ ($23 - 2 = 21$) where $\alpha = 0.05$ is 4.32. From the calculation of SPSS 25, the F_{count} was obtained at 25,551. Since $F_{\text{calculate}} > F_{\text{table}}$ so that H_0 is rejected, so the model is a linear regression, for the regression model it can be written $\hat{Y} = 50.402 + 0.381X$

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Itself.
1	Regression	939.683	1	939.683	25.551	.000b
	Residual	772.317	21	36.777		
	Total	1712.000	22			

a. Dependent Variable: Literasi Sains

b. Predictors: (Constant), Curiosity

Simple Regression Test

A simple regression test was to see if there was an influence between curiosity on students' science literacy skills after using the STAD learning model assisted by Animated Videos. Regression analysis that processes the influence between independent variables and dependent variables is called simple regression analysis. This regression test uses the help of SPSS 25. The statistical hypothesis of a simple regression test is as follows.

$H_0 : \beta_1 = 0$ (There is no effect of curiosity on science literacy ability in science learning)

$H_1 : \beta_1 \neq 0$ (There is an effect of curiosity on science literacy skills in science learning)

The influence test was carried out with the help of SPSS 25 using the Linear Regression test. Based on the results of SPSS 25 output, the value of sig. The test criteria are H_0 rejected if the price of the coefficient is $\text{sig} < 0.05$ and $t_{\text{calculate}} > t_{(\alpha/2)(df)}$ with a significance level of 5% (Sukestiyarno, 2014).

The following is a view of SPSS 25 from the results of the analysis of the influence of curiosity on students' literacy skills.

Variables Entered/Removed ^a			
Model	Variables Entered	Variables Removed	Method
1	Curiosityb	.	Enter

a. Dependent Variable: Literasi Sains

b. All requested variables entered.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.741a	.549	.527	6.06441

a. Predictors: (Constant), Curiosity

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Itself.
1	Regression	939.683	1	939.683	25.551	.000b
	Residual	772.317	21	36.777		
	Total	1712.000	22			

a. Dependent Variable: Literasi Sains

b. Predictors: (Constant), Curiosity

Coefficients ^a					
Model		Unstandardized Coefficients		Standardized Coefficients	
		B	Std. Error	Beta	t
1	(Constant)	50.402	7.935		6.352
	Curiosity	.381	.075	.741	5.055

a. Dependent Variable: Literasi Sains

Based on the significance value of the Coefficients table above, a significance value of $0.000 < 0.05$ was obtained, so it can be concluded that variable curiosity (X) affects the variable of students' science literacy ability (Y) in learning science material "The Relationship of Living Things in Ecosystems".

How to find t tables:

$$\begin{aligned}
 T \text{ table} &= (\alpha/2 ; n-k-1) \\
 &= (0.05/2 ; 23 - 1 - 1) \\
 &= (0.025 ; 21) \\
 &= 2.080
 \end{aligned}$$

Based on the value of t, it is known that t is calculated as $5.055 > t \text{ table } 2.080$ so that it can be concluded that variable curiosity (X) affects the variable of students' science literacy ability (Y). The magnitude of the correlation value (R) is 0.741. From this output, a determination coefficient (R Square) of 0.549 was obtained,

which contains the understanding that the influence of the independent variable (curiosity) on the bound variable (science literacy ability) is 54.9%.

2. Qualitative Data Analysis Techniques and Qualitative Description

a) Qualitative Data Analysis of Students' Science Literacy Ability Reviewed from Students' Curiosity

Qualitative data in this study was used to describe science literacy ability reviewed from curiosity in science learning based on high, medium, and low groups. Qualitative data analysis is carried out using four steps, namely data validity test, data reduction, data presentation, and conclusion drawn. The curiosity of VA Class students is categorized into high, medium, and low levels. Based on the results of the analysis conducted by the researcher, data was obtained that showed an increase in curiosity in students. In the data analysis, the researcher used a normalized dress value (NGain) between the pre-treatment and post-treatment values, calculated using the following equation.

$$N_{Gain} = \frac{S_x - S_y}{S_{max} - S_y}$$

Information:

NGain :

Sx : Post-treatment observation score

Sy : Pre-treatment observation score

Smax : Maximum score that students can obtain

With the following NGain value criteria:

Table 4.8 Normalized Gain Criteria (NGain) Curiosity Increase

NGain Acquisition	Criterion
$NGain > 0.70$	Tall
$0.30 \leq NGain \leq 0.70$	Keep
$NGain < 0.30$	Low

Based on calculations, classification data was obtained to increase students' curiosity. The following is the data on the classification of students' curiosity in the experimental class.

Table 4.9 Classification of Increased Curiosity of VA Class Students

Category	Many Students
Tall	2
Keep	19
Low	2

The table above shows that of the 23 students in Class VA, there are 2 students in the high curiosity category, 19 students in the medium curiosity category, and two students in the low curiosity category. From the results that have been found, the researcher then selected two students in each category, namely 2 students in the high curiosity category, 2 students in the medium curiosity category, and 2 students in the low curiosity category. The research subjects after learning can be seen in the table below.

Table 4.10 Qualitative Research Subjects

Category	Many Students	Code
Tall	2	SE-11
		SE-13
Keep	2	SE-7
		SE-6
Low	2	SE-12
		SE-1

1) Data Validity Test

The validity test of qualitative data in this study uses triangulation techniques to test the credibility of the data, namely by comparing the results of interviews with the results of the students' science literacy ability tests. The results of the data validity test show that qualitative data is valid. The full results of the data readiness test can be seen in appendix 42.

2) Data Reduction

After the qualitative data is determined to be valid, the next step is to reduce the data to select data that is truly valid so that it can be used as a more focused data source so that the data source is expected to answer the problems in this study. In this data reduction, the ability to read science literacy will be described which includes the ability to explain phenomena scientifically, conclude the results of graph data analysis and

literacy ability tests and interviews with 6 selected research subjects. The results of the data reduction are described as follows.

a) High Curiosity Group

The first respondent (SE-11) was a student with excellent science literacy skills, obtaining a score of 100 on the final test, which was far above the minimum completeness criterion (KKM) of 75. SE-11 writes complete and correct answers to all questions, including explaining scientific phenomena in questions 6, 8, and 9, where it is able to explain interactions in ecosystems, where living populations live, and the importance of biodiversity. In the indicator concluding the analysis of the graph data, SE-11 analyzes images and describes ecosystems, classifies biotic and abiotic creatures, and distinguishes food chains and food webs. In addition, SE-11 provides fact-based reasons for questions 3 and 5, explaining why tigers, worms, and fish live in different environments, as well as the factors that led to the increase in population. For question number 10, SE-11 explains how to preserve biodiversity. The results of the interviews showed that SE-11 could convey answers well and clearly. The second respondent (SE-13) also has high science literacy skills with a posttest score of 94, meeting the KKM. SE-13 answers questions 1 to 9 completely, but only writes two ways to preserve biodiversity in question number 10, which is considered incomplete. However, after interviews and guidance, SE-13 was able to provide a complete answer, showing that it was actually capable of the indicator, but experienced little confusion.

b) Medium Curiosity Group

The first respondent (SE-7) was a student with science literacy skills in the good category, obtaining a score of 88 in the final test, who met the minimum completeness criteria (KKM) of 75. Although SE-7 is able to explain the population location of living things and the importance of biodiversity well, it is incomplete in describing the types of interactions between populations in ecosystems. In the graph data analysis indicator, SE-7 succeeded in explaining the meaning of ecosystems and classifying biotic and abiotic creatures, but was wrong in distinguishing between food chains and food webs. SE-7 can also provide reasons why living things can live in different environments, but it is not complete in mentioning how to preserve biodiversity. The interviews showed that SE-7 did not have a good understanding of the interaction between the population and the differences between the food chain and the food webs, and admitted that they had forgotten about the answer to question number 10. The second respondent (SE-6) was also in the good category with a posttest score of 82, meeting the KKM. Although SE-6 is able to explain the importance of biodiversity and population places, it is still incomplete in mentioning the types of interactions between populations and has errors in definitions. SE-6 can explain the meaning of ecosystems and classify biotic and abiotic creatures, but it is still wrong in explaining the role of each component of the food chain and distinguishing between food chains and food webs. SE-6 is also incomplete in mentioning how to preserve biodiversity. In the interview, SE-6 seemed confused and did not fluently provide answers to several questions, showing the need for a better understanding of the material.

c) Low Curiosity Group

The first respondent (SE-12) was a student with science literacy skills in the poor category, obtaining a posttest score of 76, which was still below the minimum completeness criterion (KKM) of 75. In the indicator explaining the phenomenon scientifically, SE-12 is only able to provide one example of the interaction between populations in the ecosystem and is incomplete in explaining the importance of biodiversity. In the indicator concluding the analysis of the graph data, SE-12 can explain the definition of ecosystems, but cannot classify biotic and abiotic creatures, and is not precise in explaining the components of the food chain and distinguishing between food chains and food webs. In addition, SE-12 is also incomplete in explaining the reasons why living things can live in different environments and the factors that lead to population increase. For question number 10, SE-12 is still wrong in explaining how to preserve biodiversity. The results of the interviews showed that SE-12 did not master science literacy competence in all indicators, and looked confused and unconfident when giving verbal answers. The second respondent (SE-1) also had poor science literacy skills, with a posttest score of 70, below the MOH. SE-1 shows incompleteness in explaining the interaction between populations in ecosystems and errors in explaining the location of living creature populations. He can explain the meaning of ecosystems, but he is still wrong in giving examples of biotic and abiotic creatures, and is not accurate in explaining the components of the food chain and the difference between the food chain and the food web. SE-1 is also incomplete in providing reasons why living things can live in different environments and in mentioning factors for population growth. For question number 10, SE-1 provides an inappropriate explanation on how to preserve biodiversity. The results of the interviews showed that SE-1 gave oral answers that were not fluent and sometimes perfunctory, reflecting a lack of understanding of the material.

Conclusion of Science Literacy Ability Reviewed from Students' Curiosity.

The results of the analysis conducted by the researcher lead to a conclusion about science literacy ability when reviewed from the curiosity of students. The results of the analysis showed that the science literacy ability

of students in the high, medium and low curiosity groups had different characteristics. Students with the same curiosity are not closed to the possibility of having differences in the level of mastery of science literacy skills. Students with high curiosity are able to master the competence of science literacy skills very well. The four indicators of science literacy ability can be done correctly. Students are able to explain phenomena scientifically related to ecosystems, are able to deduce the results of graph data analysis and the results of identification of images, are able to provide reasons for a phenomenon based on related facts or events, are able to find steps and decide on solutions to solve problems in preserving biodiversity. Students who have curiosity are mastering science literacy competencies quite well. Students are quite capable in explaining phenomena scientifically, deducing the results of graph data analysis and identification results, giving reasons for a phenomenon based on facts or events, but students with the medium curiosity category are still incapable of finding steps and deciding solutions from solving problems about ecosystems, in this case it is a step or way to maintain the preservation of protected biodiversity so that it does not become extinct. Meanwhile, students with low curiosity are still lacking in their science literacy skills. Students have difficulty in explaining phenomena scientifically, concluding the results of graph data analysis and identification results, giving reasons for a phenomenon based on facts or events, and have not been able to find steps and decide on solutions from solving problems related to ecosystems.

1. Learning Quality of STAD Model Assisted by Animated Video

The study was conducted quantitatively to analyze the learning quality of the Student Team Achievement Division model assisted by Animation Videos. Some of the stages carried out in this study include analysis of learning tools, initial data analysis, and final data analysis.

Learning tool analysis is a preparatory step before the research is carried out by conducting a series of learning tool validation by validators. The results obtained a score of learning tools with a minimum good category, which means that the learning tools are valid and can be used in research.

Initial data analysis needs to be carried out by conducting a series of tests considering that the class used as the research subject must also be a normal, homogeneous class, and have an initial average similarity, so that the researcher conducts a normality, homogeneity, and average similarity test. The test results showed that the two classes were normally distributed, homogeneous and had the same average initial mathematical critical thinking ability.

After the learning tools or research instruments are valid and the two classes are distributed normally, homogeneously and have the same average initial science literacy ability, the activity continues by conducting research on the two classes, namely the experimental class and the control class. Experimental classes are classes that apply learning with the Student Team Achievement Division model with the help of Animated Videos, while control classes are classes that use the Student Team Achievement Division without the help of Animated Videos.

The final data analysis is an analysis of students' science literacy skills with the Student Team Achievement Division model assisted by Animation Videos. At this stage, in addition to conducting a test of normality and homogeneity of the final data, the researcher also conducted a hypothesis test. The results of the normality and homogeneity test on the final data showed that the experimental class and the control class were normally distributed and had a homogeneous population.

Based on the results of observations by observers through the observation sheet of teachers' ability to manage learning, teachers have carried out learning in accordance with the steps of the Student Team Achievement Division model with the help of animated videos. Learning is carried out slowly because the stimulation of science literacy skills is only carried out in the classroom. At the initial meeting, it was seen that students still needed a long time to be able to understand the subject matter used and the learning model carried out. In the learning activities, students try to understand the relationship between ecosystem components and food webs in the surrounding environment with the help of animated videos. Students are given a Student Worksheet (LKPD) at each meeting to be discussed in their respective groups. When there are students who have difficulties in understanding the problem, they will be helped by their group friends and if they are still having difficulties, the teacher will provide guidance. When the group presented the results of the work on the LKPD in front of the class, the other group gave a response. Teachers also provide reinforcement related to the results of science literacy skills with ecosystem materials. The teacher always provides reinforcement to students about the material that has been learned in each meeting and then provides evaluation questions. The activity continued by correcting the students' answers together, giving awards to the best group and making conclusions from the material that had been studied. The teacher also gives home assignments for students by doing some practice questions. The teacher conducts an evaluation to measure students' understanding and mastery of the material that has been taught from meetings 1 to 6 by giving posttest questions to students.

The final data in the form of posttest results were then analyzed with a series of tests including normality tests, homogeneity tests and hypothesis tests. Based on the test results that have been presented in the research results section, it shows that both the experimental class and the control class are normally distributed and have a homogeneous population so that it can be continued with hypothesis testing. The following is a discussion related to the results of the hypothesis test in this study.

a. Completeness of Science Literacy Ability

The completeness of science literacy skills included classical and average completeness, with results showing that more than 75% of students in the experimental class who used the Student Team Achievement Division model assisted by animated videos achieved classical completeness of 88% and an average score above 75, which is 90. This learning is effective in improving science literacy skills, which are focused on four indicators: explaining scientific phenomena, deducing graphical data, providing reasoning based on facts, and solving problems. The contextual learning process allows learners to construct new knowledge as well as increase interest and curiosity. Although this model is not yet common at MI Luqman Al-Hakim, its application is expected to replace the conventional method that is still dominant. The learning tools prepared include animated videos and worksheets for students to train science literacy on ecosystem materials, with description questions that include indicators of science ability.

b. Differences in Science Literacy Ability in the Experimental Class and the Control Class

The results of the study showed that the science literacy ability in classes that used the Student Team Achievement Division model assisted by animated videos (experimental class) and classes that only applied learning with the Student Team Achievement Division model (control class) there were differences in both classical completeness, average grade completeness, and average improvement in science literacy skills. After analyzing the posttest results, the completeness of the experimental class reached 88% with an average score of 90. Meanwhile, the completeness of the control class was 75% with an average score of 81.08. Based on the results of the tests carried out, it was concluded that the classical completeness and completeness of the average score of the students' science literacy ability in the experimental class was greater than that of the control class. Likewise, the average improvement in science literacy ability in the experimental class was better than the control class. The average increase in science literacy ability in the experimental class reached an n-gain score of 0.8685 and the control class of 0.74154. The difference in the science literacy ability of students in the experimental class and the control class is due to the treatment or implementation of learning that is indeed different in the two classes. Learning in the teacher's experimental classroom presents learning by following the learning steps of the Student Team Achievement Division model with the help of animated videos.

c. The Influence of Curiosity on Students' Science Literacy Skills

The results of the simple regression test showed that the t count was 5,055, which is larger than the t table 2,080, indicating a significant influence between curiosity and the science literacy ability of students. Learning with the Student Team Achievement Division model assisted by animated videos in the material "Relationships of Living Things in Ecosystems" has been proven to improve both aspects. The higher the curiosity of students, the better their science literacy skills will be. This finding is in line with the research of Noviyanto & Sumaryoto (2021), which also found a significant influence of curiosity on the science literacy of high school students in South Tangerang, with a value of Sig. = 0.027 and t count = 2.252. The test confirms that curiosity plays an important role in improving science literacy; The lower the curiosity, the lower the science literacy ability. This is in accordance with Gega's (1977) theory, which states that curiosity is one of the four main attitudes that must be developed in science, along with inventiveness, critical thinking, and persistence. Curiosity clearly affects students' science literacy skills.

From the description above, it can be concluded that the hypotheses in this study are proven, namely:

(1) The average science literacy ability of students who use the STAD-type cooperative learning model assisted by animated videos is more than BTA; (2) the science literacy ability of students in the model achieved classical completeness with a proportion of more than 75%; (3) The average science literacy ability of students in the animated video-assisted STAD model is better than the ordinary STAD model; (4) The proportion of completeness of science literacy skills in this model is higher than that of the STAD model; (5) The average increase in students' science literacy skills in the STAD model assisted by animation videos is greater than the STAD model; and (6) There is a significant influence of curiosity on science literacy skills in science learning on the material on the relationship between living things in the class V ecosystem. Learning with the Student Team Achievement Division model assisted by animated videos has been proven to be effective in improving science literacy skills for several reasons: (1) Students are better prepared and understand the subject matter; (2) They get more questions and questions in student worksheets (LKPD) as well as animated video media that are relevant to the context of daily life; (3) Students are more active in asking friends and teachers about material that they have not understood; and (4) They are more active in discussions, so that they truly understand the concept of relationships between living things in ecosystems.

2. Description of Science Literacy Ability Reviewed from Students' Curiosity

Qualitative research was carried out with the aim of describing science literacy abilities reviewed from the curiosity of students. The results of interviews were conducted on 6 (six) selected students in the high, medium and low categories based on the curiosity of the students. The interview was conducted to explore the level of science literacy ability when reviewed from the three curiosity groups of students.

a. Science Literacy Ability Reviewed from Curiosity High

Students with high curiosity in learning the STAD model assisted by animated videos showed excellent mastery of science literacy competencies, including four indicators: explaining scientific phenomena, deducing the results of graph data analysis, providing reasoning based on facts, and solving problems. In the material on the relationship between living things in ecosystems, they were able to explain the interaction between populations, population locations, and the importance of biodiversity. In addition, they can analyze images, deduce ecosystem definitions, and explain the roles of biotic and abiotic creatures, including the differences between food chains and food webs. These students show a broad and complete mindset, thanks to discipline and perseverance in the learning process. They actively completed exercises on student worksheets (LKPD) and homework, and were careful in checking answers. The high level of curiosity makes them ask more questions about ununderstood material, experiment, and discuss in groups, showing their ability to organize themselves to achieve learning goals. This is in line with Gega's theory (1977) which emphasizes the importance of curiosity, inventiveness, critical thinking, and persistence in the development of scientific attitudes. Students with a high curiosity attitude are actively involved in learning, driven by the desire to acquire new knowledge, in accordance with Maslow's theory that humans have a need to know and understand, which contributes to better science literacy abilities.

b. Science Literacy Ability Reviewed from Curiosity Medium

Students with moderate curiosity in learning with the STAD model assisted by animated videos are generally quite good in science literacy competencies. The weakness of students in this category is that they are still lacking in indicators of finding steps and deciding solutions from problem solving. In the learning material in this research, students still make mistakes in explaining how to preserve biodiversity. This shows that the student has not been able to build a complete new understanding and knowledge so that students have difficulty finding steps or solutions to a problem. So in this case, the role of the teacher should not only provide information but more importantly understand what students think and help students think and learn in finding their knowledge (Budiyanto & Rohaeti, 2014).

c. Science Literacy Ability Reviewed from Low Curiosity

Students with low curiosity in learning using the animated video-assisted STAD model showed significant weaknesses in science literacy skills. They have difficulty explaining scientific phenomena, concluding the results of graph data analysis, and providing the right reasons based on facts or events. In addition, these students have not been able to explain the interactions in ecosystems, the importance of biodiversity, or differentiate between food chains and food webs. This problem arises from several factors, including the shyness to ask, which is a major indicator of curiosity. Observations in the classroom show that students with low curiosity tend to be passive and only learn when there is an assignment from the teacher or during exams, and lack the habit of reading to expand their horizons. This opinion is in line with the findings that low science literacy is often associated with low reading literacy. To improve science literacy skills among students who have low curiosity, it is important for them to be trained to be more active in asking questions and have a greater interest in science lessons. Teachers need to create an interesting and meaningful learning atmosphere, so that curiosity can emerge and develop. High curiosity is not only important for encouraging motivation to learn, but also for building scientific attitudes, critical thinking, and creativity. Thus, fostering interest and curiosity in learners is essential to achieve better learning outcomes and develop overall science literacy skills. This will help learners become active thinkers and critical observers, which in turn will increase their engagement in the learning process.

CONCLUSION

Based on the results of the study, it can be concluded that learning using the Student Team Achievement Division (STAD) model assisted by animated videos has proven to be effective in improving students' science literacy skills, which are shown through various indicators. The learning tools developed are within the minimum criteria according to the validators, with an average validity value of 3.854 or 77%, so they can be used in research. The analysis of student and teacher responses showed that teachers' ability to manage learning was at least good criteria, with an average practicality score of 92% and learning implementation reaching 92.71%, which shows that all learning tools are practical and the implementation of the STAD model assisted by animation videos is carried out very well. The hypothesis test showed that the average value of students' science literacy ability in this learning exceeded the minimum completeness criterion of 75, with the results of

the tcal test $>$ ttable ($8.15482 > 1.71$) and classical completeness reaching more than 75% ($z_{hitung} > z_{tabel}$, $2.28733 > 0.6736$). In addition, the average science literacy ability of students through this model is better than the ordinary STAD model, which is evidenced by the results of the tcal test ($1.98795 > 0.6736$), as well as a better proportion of completeness ($zhcount > ztable$, $3.31845 > 2.014103$). The average increase in students' science literacy ability in this model is higher than other STAD models, as can be seen from the values of $\mu g1$ (0.8685) $>$ $\mu g2$ (0.74154). In addition, students' curiosity has a positive influence on science literacy skills, which can be seen from the significance values of < 0.05 ($0.000 < 0.05$) and t count ($5.055 >$ t table 2.080). This study also categorized students' curiosity into high, medium, and low, with qualitative analysis showing that subjects with high curiosity met all indicators of science literacy ability, while subjects with moderate curiosity only mastered a few indicators well, and subjects with low curiosity did not meet all indicators. Therefore, it can be concluded that students with high curiosity have better science literacy skills compared to those with medium and low curiosity, and students with moderate curiosity are better than those with low curiosity.

REFERENCES

- Al-Shibami, A. H., Alateibi, N., Nusari, M., Ameen, A., Khalifa, G. S. A., & Bhaumik, A. (2019). Impact of organizational culture on transformational leadership and organizational performance. *International Journal of Recent Technology and Engineering*, 8(2 Special Issue 10). <https://doi.org/10.35940/ijrte.B11116.0982S1019>
- Arifin, F., Troena, E. A., Djumahir, M. R., & Rahayu, M. (2014). Organizational culture, transformational leadership, work engagement and teacher's performance: Test of a model. *International Journal of Education and Research*, 2(1), 1–14.
- Budiyanto, A. M., & Rohaeti, E. E. (2014). Mengembangkan Kemampuan Berpikir Kreatif dan Kemandirian Belajar Siswa SMA melalui Pembelajaran Berbasis Masalah. *Jurnal Pengajaran MIPA*, 19(2), 166–172.
- Cacciola, J. S., Alterman, A. I., DePhilippis, D., Drapkin, M. L., Valadez, C. J., Fala, N. C., Oslin, D., & McKay, J. R. (2013). Development and initial evaluation of the Brief Addiction Monitor (BAM). *Journal of Substance Abuse Treatment*, 44(3), 256–263.
- Farid, A., & Pratama, A. I. (2020). The Influence of The Headmaster Transformational Leadership Style Toward Teacher's Work Ethics In The Al-Farisi Junior High School Tapos Tenjo Bogor. *Islamic Management: Jurnal Manajemen Pendidikan Islam*.
- Hordatt Gentles, C. (2018). Reorienting Jamaican teacher education to address sustainability: challenges, implications and possibilities. *Caribbean Quarterly*, 64(1), 149–166.
- Jufrida, J., Basuki, F. R., Kurniawan, W., Pangestu, M. D., & Fitaloka, O. (2019). Scientific literacy and science learning achievement at junior high school. *International Journal of Evaluation and Research in Education*, 8(4). <https://doi.org/10.11591/ijere.v8i4.20312>
- Kelana, J. B., & Pratama, D. F. (2019). *Bahan ajar IPA berbasis literasi sains*. Lekkas.
- Kelp, N. C., McCartney, M., Sarvary, M. A., Shaffer, J. F., & Wolyniak, M. J. (2023). Developing Science Literacy in Students and Society: Theory, Research, and Practice. *Journal of Microbiology & Biology Education*, 24(2). <https://doi.org/10.1128/jmbe.00058-23>
- Ketut, S., Dantes, N., Arnyana, I. B. P., Suarni, N. K., Suartama, I. K., & Suranata, K. (2022). Developing testing instruments to measure science literacy of elementary school students. *Cypriot Journal of Educational Sciences*, 17(12). <https://doi.org/10.18844/cjes.v17i12.7730>
- Kidd, C., & Hayden, B. Y. (2015). The psychology and neuroscience of curiosity. *Neuron*, 88(3), 449–460.
- Lin, X. F., Wong, S. Y., Zhou, W., Shen, W., Li, W., & Tsai, C. C. (2024). Undergraduate Students' Profiles of Cognitive Load in Augmented Reality-Assisted Science Learning and Their Relation to Science Learning Self-efficacy and Behavior Patterns. *International Journal of Science and Mathematics Education*, 22(2). <https://doi.org/10.1007/s10763-023-10376-9>
- Mardhiyana, D., & Sejati, E. O. W. (2016). Mengembangkan kemampuan berpikir kreatif dan rasa ingin tahu melalui model pembelajaran berbasis masalah. *PRISMA, Prosiding Seminar Nasional Sains*, 672–688.
- Margunayasa, I. G., Dantes, N., Marhaeni, A. A. I. N., & Suastra, I. W. (2019). The effect of guided inquiry learning and cognitive style on science learning achievement. *International Journal of Instruction*, 12(1). <https://doi.org/10.29333/iji.2019.12147a>
- Mouromadmoni, K. R., Atun, S., & Nurohman, S. (2019). Students' curiosity profile in excretion system topic taught using authentic inquiry learning. *JPBI (Jurnal Pendidikan Biologi Indonesia)*, 5(3), 397–406.
- Noviyanto, T. S. H., & Sumaryoto, S. I. (2021). Pengaruh Rasa Ingin Tahu Dan Percaya Diri Terhadap Kemampuan Literasi Sains Siswa Sekolah Menengah Atas Di Kota Tangerang Selatan. *Jurnal Penelitian Sains Dan Pendidikan (JPSP)*, 1(2), 143–150.

- Pamara, F., & Bayudhigantara, E. M. (2022). Transformational Leadership and Organizational Culture on Employee Engagement With Work Satisfaction as an Intervening Variable. *Journal Research of Social Science, Economics, and Management*, 1(12). <https://doi.org/10.59141/jrssem.v1i12.239>
- Safrizal, S., Sudarmono, & Yulia, R. (2022). Developing Students Science Literacy in Adiwiyata School: Case Study in Padang City, Indonesia. *Journal of Turkish Science Education*, 19(4). <https://doi.org/10.36681/tused.2022.169>
- Umar, M., & Sukarno, S. (2022). The influence of fiqh insights and science literacy on student ability in developing Quran-based science. *International Journal of Evaluation and Research in Education*, 11(2). <https://doi.org/10.11591/ijere.v11i2.22012>
- Yuberti, Y., Komikesari, H., & Lubis, M. (2022). Developing STEM-Based Interactive E-Books to Improve Students' Science Literacy. *Tadris: Jurnal Keguruan Dan Ilmu Tarbiyah*, 7(1). <https://doi.org/10.24042/tadris.v7i1.10914>