Bridging Culture and Science: The Impact of Kajang Inspired LKPD on the Scientific Literacy of SMP Students in Bulukumba

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Abstract. This study investigates the impact of using LKPD based on the local wisdom of the Kajang community, implemented through the CRT (Culturally Responsive Teaching) approach, on the science literacy of seventh-grade students at SMPN 1 Bulukumba. The research aims to assess: the science literacy levels of students before and after the intervention, the improvement in science literacy post-intervention, and the significance of this improvement. A pre-experimental One Group Pretest-Posttest design was used, with a sample of 30 students from class VII.5, selected through purposive sampling from a total of 295 students across 10 classes. These students, all of Bugis-Konjo origin, underwent a science literacy test, and the data were analyzed using descriptive and inferential statistics. The results showed that the level of science literacy before the application of LKPD based on local wisdom of the Kajang community through the CRT approach was in the low category with a score of 7.63. After the application of LKPD based on local wisdom of the Kajang community through the CRT approach, it was in the high category with a score of 13.10. The increase in science literacy of seventh-grade students of SMPN 1 Bulukumba after the application of LKPD is in the medium category with an N-Gain score of 0.46. There is a significant increase in the science literacy of seventh-grade students of SMPN 1 Bulukumba after the application of LKPD based on local wisdom of the Kajang community through the CRT approach, as indicated by the t-test results.

Keywords: LKPD, Local Wisdom, Suku Kajang, CRT, Science Literacy.

1 Introduction

Education in the 21st century, also known as the era of the industrial revolution 4.0, education must prepare students for the challenges of the globalization era, environmental concerns, information technology advancements, the integration of science and technology, a knowledge-based economy, the rise of creative industries, changes in the balance of power in the global economy, and the effects of science-based technology. Therefore, mastery of literacy in reading, math, and science is a very important aspect

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[1]. Digital literacy is closely related to science literacy. The application of digital literacy can help learners become more confident and foster curiosity, creativity, and critical thinking, as well as in the application of science literacy [2], [3].

The OECD (Organization for Economic Co-operation and Development) [4] defines scientific literacy as the knowledge of science utilized to find new information, elucidate scientific phenomena, and derive conclusions on science-related topics, hence enabling engagement with science-related challenges. Learners' science literacy skills in an international context have been measured through PISA (Program International Student Assessment).

The 2022 PISA (Program for International Student Assessment) results published by the OECD [5] indicate that Indonesian students scored 65th out of 79 participating nations in science literacy, achieving a score of 383. In terms of scientific literacy, Indonesia's rating in PISA 2022 improved by six positions relative to PISA 2018. However, Indonesia's PISA 2022 science literacy score decreased by 13 points [6]. Science literacy is not only about understanding concepts, but also the ability to apply science in everyday life, ensuring that students not only understand science as a concept but can also apply it well [7], [8], [9]. However, although science literacy has an important value in life, students' science literacy skills are not fully adequate. This can be seen from the PISA results from 2000 to 2022 which show that the science literacy skills of Indonesian students at the international level did not get maximum results [10].

However, several previous studies related to the science literacy skills of junior high school students in several regions in Indonesia also demonstrated disparate results. The findings of [11] indicated that the level of science literacy at SMPN 1 Gresik was situated within the medium category. The findings of the study conducted by [12] indicate that the science literacy skills of students at SMPN 4 Belik Pemalang in Central Java are situated within the low category. In a separate study, [13] found that the science literacy skills of students at SMPN 2 Bua Ponrang Luwu Regency, South Sulawesi, were in the low and very low categories, with a mean score of 58.03%.

Factors that cause the low science literacy skills of students include several things, including the selection of learning resources that only rely on textbooks that have not fully touched the soul of students, as a result, lessons become boring and students lack understanding of subjects in the context of life. In addition, the learning environment and climate at school also affect the variation in students' literacy scores [14], [15], [16]. The role of educators is not only as the only source of learning, but also must have the skills to plan and create various other learning resources such as teaching materials, modules, Learner Worksheets (LKPD), and media. This aims to create a conducive learning environment [17]. LKPD is a printed teaching material that facilitates learner interaction with the subject matter. With various activities contained in it, LKPD encourages students to actively participate in learning. Its function is not only to make it easier for students to understand concepts, but also to assist educators in implementing the learning process by providing practice tasks [18].

However, the majority of extant LKPDs concentrate on queries that are incongruous with the character and learning environment of students. It is therefore necessary to apply an LKPD model that is more suitable for the material, characteristics, and environment of students. The objective of innovation in the LKPD model is to enhance the learning process, thereby facilitating more effective conceptual mastery [19], [20].

The implementation of learning can be more effective to achieve educational goals in accordance with the National Education System Law no.20 of 2003, by integrating local wisdom values. Local wisdom refers to the ways and practices that develop in a community, stem from a deep understanding of the local environment, and are passed down from generation to generation [21], [22]. Unfortunately, the application of learning tools, especially LKPDs that include students' regional culture is still minimal. Therefore, many students do not know the types of culture in their own area. The solution to this problem is the application of LKPD based on local wisdom [23]. The implementation of LKPD in accordance with local wisdom is essential for the advancement of regional excellence, while simultaneously incorporating local wisdom into the educational curriculum [24]. Junita's research [25] indicates that LKPD based on local wisdom is an effective method for enhancing students' science literacy.

Although there are various cultures in Indonesia, efforts to preserve them are still limited. Therefore, it is important to introduce cultural diversity to students through the learning process, one of which is by using Learner Worksheets (LKPD). Learner Worksheets (LKPD) are designed according to the subject matter and need to be associated with local wisdom values. The implementation of LKPD in accordance with local wisdom is of significant importance, as LKPD facilitates the integration of learning concepts with local wisdom in the surrounding area. The values of local wisdom from the school environment and students are integrated into learning through the use of Learner Worksheets (LKPD) [26], [27].

LKPD based on local wisdom is designed by integrating various forms of local wisdom into the subject with the aim of introducing local wisdom values in the local area to students. The values of local wisdom incorporated into the LKPD can be the basis for developing better learning. It is unfortunate that, at present, only a small number of educational establishments incorporate local wisdom values into their teaching and learning processes. Consequently, students' knowledge of local wisdom in their area remains limited. In accordance with the findings of the interviews conducted at SMPN 1 Bulukumba, South Sulawesi, with one of the 7th grade science educators, it was ascertained that the learning tools, in the form of Learner Worksheets, utilized at SMPN 1 Bulukumba remained devoid of a foundation in local wisdom. Consequently, students were unable to gain an understanding of the local wisdom that pertains to their own region. Furthermore, the LKPD utilized by educators has proven ineffective in facilitating instruction on science literacy skills, resulting in unsatisfactory AKM outcomes at SMPN 1 Bulukumba.

The problems obtained from the results of these interviews make researchers need to apply LKPD in accordance with the local wisdom of students, namely on the material of Indonesian ecology and biodiversity in order to help students recognize local wisdom in their area and easily understand the questions given. In this study, researchers chose local wisdom in the Kajang community in Bulukumba Regency, South Sulawesi. This is because the Kajang community has diverse customs, norms, and local wisdom, one of which is the preservation of their customary forests. The community has a belief in the sacredness of the forest in the Kajang customary area, where the function of the forest ecosystem is in line with modern views, namely as a source of rain and a source of springs (*timbusu'*). In other words, the forest is the lungs of the world. Therefore, the Kajang community's treatment of the forest not only aims to maintain its ritual function, but also aims to maintain its ecological function, namely as protection [28].

The implementation of appropriate teaching materials is also a crucial aspect of an effective learning approach. The selection of an appropriate learning approach is crucial for facilitating students' comprehension of the subject matter and is anticipated to enhance their scientific literacy abilities. It is therefore essential to prepare teaching materials in the form of LKPD based on local wisdom using the Culturally Responsive Teaching (CRT) approach [29]. Culturally Responsive Teaching (CRT) according to [30], [31] is the use of cultural knowledge and various learning experiences of students to create relevant and significant learning experiences. This approach emphasizes the importance of learners acquiring new information through their environment and background by applying techniques that integrate the culture, background and characteristics of learners [32]. In a study conducted by [33] showed that the application of CRT in learning can improve students' science literacy skills as measured using local wisdom-based evaluation tools on vibration and wave material. Similarly, the results of research by [34], [35] state that the Culturally Responsive Teaching (CRT) approach can improve students' science literacy.

Based on research conducted by [25] posits that an LKPD based on local wisdom is an efficacious pedagogical approach for enhancing students' science literacy. Another study conducted by [36] asserts that LKS based on the local wisdom of Malang is an effective pedagogical approach. Based on consideration of the background, the researcher will undertake a study with the following title “Bridging Culture and Science: The Impact of Kajang Inspired LKPD on the Scientific Literacy of SMP Students in Bulukumba”.

2 Method

This research employs a pre-experimental method with a one-group pretest-posttest design [37]. Prior to the administration of the treatment, a pretest is administered to enable a more precise assessment by comparing the pre-treatment and post-treatment conditions.

Table 2.1 One Group Pretest-Posttest Design

Pretest	Treatment	*Posttest*
O_1	X	O_2

Description:
X = The treatment is taught using LKPD based on the CRT approach.
O_1 = *Pretest* (Before treatment)
O_2 = *Posttest* (After the treatment)

The population under investigation consisted of all seventh-grade students at SMPN 1 Bulukumba during the 2023/2024 academic year. The student body was divided into ten classes, with a total of 295 students. The sample for this study was drawn from seventh-grade students at SMPN 1 Bulukumba in the 2023/2024 school year. These students were selected using the purposive sampling technique. The sampling technique was employed with the consideration that the learning outcomes of the students were largely homogeneous and that they were native to Bulukumba and included the Bugis-

Konjo tribe. Consequently, the sample utilized was one class, which served as the experimental class, specifically class VII. The final sample consisted of 5 students, with a total of 30 students.

The data collection instrument in this study used a student science literacy test instrument, namely the score obtained by students after working on 20 multiple choice science literacy test items on Indonesian ecology and biodiversity material from pretest and posttest results based on competency aspects of science literacy, containing three indicators, namely: 1) explain phenomena scientifically, 2) design and evaluate scientific investigations, 3) interpret data and evidence scientifically. Data analysis techniques in this study were carried out by means of descriptive analysis and inferential analysis. The categories of students' science literacy test scores are as follows [38].

Table 2.2 Category of Science Literacy Test Score of Learners

Score Interval	Category
17-20	Very high
13-16	High
9-12	Medium
5-8	Low
0-4	Very low

The improvement of students' science literacy is determined using the N-Gain formula according to [39] as follows:

$$\text{N-gain} = \frac{\text{Postest Score-Pretest Score}}{\text{Maximum Score-Pretest Score}}$$

The N-gain results are then categorized into three categories in the following table:

Table 2.3 N-Gain Criteria

N-gain Score	*N-gain* Criteria
$N\text{-}gain \geq 0{,}7$	High
$0{,}3 \leq N\text{-}gain < 0{,}7$	Medium
$N\text{-}gain < 0{,}3$	Low

The hypothesis testing employed in this study is the paired sample t-test, conducted with the assistance of the SPSS 25.0 for Windows program. Prior to hypothesis testing, an analysis prerequisite test was conducted in the form of a normality test. The normality test employed in this study was the Shapiro-Wilk test.

3 Results and Discussion

3.1 Research Results

The results of this study were subjected to analysis using descriptive and inferential statistics, the latter of which is explained in further detail below.

Descriptive Statistical Analysis:

Descriptive Statistics of Science Literacy Pretest-Posttest Score. The descriptive statistical analysis of science literacy scores of students in class VII.5 SMP Negeri 1 Bulukumba, conducted before and after the implementation of LKPD based on the local wisdom of the Kajang community through the CRT approach, yielded pretest and posttest scores, as presented in Table 4.

Table 3.1 Results of Descriptive Statistical Analysis of Science Literacy of Class VII.5 Students

Descriptive Statistics	Experiment Class	
	Pretest	*Posttest*
Number of Samples	30	30
Ideal Score	20	20
Highest Score	11	17
Lowest Score	3	8
Average Score	7,63	13,10
Standard Deviation	2,08	2,41
Variance	4,03	5,81

Table 3.1. illustrates that the descriptive statistical analysis of the science literacy pretest in the experimental class, comprising a sample size of 30 students, yielded the highest score of 11 and the lowest score of 3. In contrast, the posttest demonstrated an increase in the highest score obtained by students to 17 and a decrease in the lowest score to 8. The mean pretest score was 7.63, with a standard deviation of 2.08 and a variance of 4.03. With regard to the posttest, the average score was 13.10, with a standard deviation of 2.41 and a variance of 5.81. A summary of the mean scores for the students is provided in Table 3.2.

Table 3.2 Category of Average Pretest and Posttest Score of Class VII.5 Students

Variables	*Pretest*	Category	*Posttest*	Category
Science Literacy	7,63	Low	13,10	High

Based on Table 3.2, the pretest results indicate a science literacy level of 7.63, which falls within the low category. In contrast, the posttest results demonstrate a notable increase to 13.10, which is now within the high category. This suggests that students in class VII.5 exhibited enhanced science literacy skills following the implementation of the intervention, as compared to their performance prior to the intervention.

Frequency distribution is required in order to ascertain the number of students who have obtained pretest and posttest scores within the specified score interval, thus enabling the identification of the score category. The frequency distribution of students' science literacy is presented in Table 3.3. Based on the data obtained in Table 3.3., the implementation of LKPD, grounded in the local wisdom of the Kajang community through the CRT approach, has led to a discernible shift in the level of science literacy among students.

Table 3.3 Frequency and Percentage Distribution of Science Literacy of Class VII.5 Students

Score Interval	Category	Frequency			
		Pretest	Percentage (%)	*Posttest*	Percentage (%)
17-20	Very High	0	0	2	7
13-16	High	0	0	17	57
9-12	Medium	11	37	9	30
5-8	Low	17	57	2	6
0-4	Very Low	2	6	0	0
Totally		30	100	30	100

Prior to the implementation of the LKPD approach, which was based on the local wisdom of the Kajang community and employed the CRT methodology, the majority of students were classified within the low category, with 17 students accounting for 57% of the total number of students. Following the implementation of LKPD based on the local wisdom of the Kajang community through the CRT approach, there has been a notable increase in the number of students who have achieved the high category, with 17 students accounting for 57% of this group. Two additional students, representing 7% of the total, are situated in the very high category.

N-Gain Analysis. N-Gain analysis was conducted to ascertain the extent of the increase in science literacy among students in class VII.5 at SMPN 1 Bulukumba following the implementation of LKPD in accordance with the local wisdom of the Kajang community through the CRT approach on the material of Indonesian ecology and biodiversity. Data obtained after conducting Pretest and Posttest on students, namely in Table 4.4.

Table 3.4 N-Gain Percentage of Science Literacy of Class VII.5 Students

Interval	Frekuensi	Kategori
N-gain ≥ 0,7	1	Tinggi
0,3 ≤ N-gain < 0,7	22	Sedang
N-gain < 0,3	7	Rendah

As illustrated in Table 3.4, the majority of students demonstrated moderate science literacy, with a frequency of 22 students. The mean N-Gain score for science literacy is presented in Table 3.5.

Table 3.5 Average N-Gain of Science Literacy of Class VII.5 Students

Score		Average N-Gain Score	Categpry
Pretest	*Postest*		
7,63	13,10	0,46	Medium

Based on Table 3.5 indicates that the N-Gain analysis revealed an increase in the science literacy of students both before and after the learning period. The average N-Gain score was 0.46, which falls within the medium category.

Analysis of Achievement of Science Literacy Indicators. The achievement of students' science literacy on the material of Indonesian ecology and biodiversity can be seen from

the increase in each indicator. There are three indicators of science literacy that must be achieved by students, namely: 1) the ability to explain phenomena scientifically, 2) design and evaluate scientific investigations, 3) interpret data and evidence scientifically. The improvement of the three indicators is shown in Table 3.6.

Table 3.6 Results of N-Gain Achievement of Each Indicator of Science Literacy Class VII.5

No	Indicator	Question Number	Average Ccore		*N-Gain*	Category
			Pretest	*Posttest*		
1	Explaining scientific phenomena	1,2,3,4,6, 7,14	3,06	5,50	0,61	Medium
2	Design and evaluate scientific investigations	5,8,9,10,1 1,12,13	3,43	4,50	0,30	Medium
3	Interpret data and evidence scientifically	15,16,17,1 8,19,20	1,16	3,10	0,26	Low

Table 4.6 illustrates an increase in the achievement of science literacy indicators in class VII.5. The greatest increase in achievement is observed for the indicator that explains scientific phenomena, with an N-Gain of 0.61, which falls within the medium category. The lowest indicator achievement is that of interpreting data and evidence scientifically, with an N-Gain of 0.26 in the low category.

Inferential Statistical Analysis: The results of the inferential statistical analysis are presented for hypothesis testing in the t-test, with a significance level = 0.05. In order for hypothesis testing to be valid, the data obtained must be normally distributed.

Normality Test. The normality test is employed to ascertain whether the research data exhibits a normal distribution. The data were obtained from the pretest and posttest scores of students and subsequently analyzed using the Shapiro-Wilk test, with the provisions of the significance level set at > 0.05, using the SPSS 25.0 program. The results of the normality test for science literacy among students in Class VII.5 are presented in Table 3.7.

Table 3.7 Shapiro-Wilk Normality Test of Science Literacy with SPSS 25.0

Tests of Normality			
Class	*Shapiro-Wilk*		
	Statistic	Df	Sig.
Pretest	0,964	30	0,398
Posttest	0,949	30	0,159

Table 3.7 provides the statistical value, number of samples (df), and significance value of the Shapiro-Wilk tests. In this study, the significance value was derived from the Shapiro-Wilk test, as it is more robust in the presence of small samples than the Kolmogorov-Smirnov test. The results of the SPSS "Shapiro-Wilk Test" indicate that the significance value (Sig) for the pretest of science literacy is 0.398, while the Sig for

the posttest of science literacy is 0.159. The significance value for the pretest and post-test via the Shapiro-Wilk test is greater than 0.05, indicating that the data from the aforementioned tests are normally distributed.

Hypothesis Testing. The hypothesis testing employed in this study is the paired simple t-test. The Paired Simple T-Test is a variant of the t-test that is applicable when the samples are related to each other. A paired sample is defined as a sample comprising the same subject, who experiences two distinct treatments: a pretest (conducted prior to the administration of the treatment) and a posttest (conducted following the treatment). The results of the science literacy hypothesis test, conducted using the Paired Sample T-Test, are presented in Table 4.8 below,

Table 3.8 Hypothesis Test for Science Literacy Using the Paired Sample T-Test Test

df	t_{hitung}	t_{Table}	Sig.
29	11,840	1,699	0,000

Basic conditions for decision making on Paired Sample T-Test:

1) If the value of $t_{count} > t_{Table}$, then H_0 is rejected H_1 is accepted
2) If the value of $t_{count} < t_{Table}$, then H_0 is rejected H_1 is accepted

Based on the Paired Sample T-Test table, it can be seen that the t-count value on science literacy is 11.840. The t_{count} value is an absolute value, so it cannot be seen from the sign (+) or (-).

The determination of the t-table value is accomplished by examining the significance level (α) and the degree of freedom (df). The value of the significant level α is 0.05, and the degree of freedom (df) is df = N-1, where N is the sample size. In this case, N = 30, so df = 30-1 = 29. The t_{Table} value is thus 1.699. The results of the analysis of science literacy yielded a t-count of 11.840, which exceeded the t-table value of 1.699. This indicates that the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. It can thus be concluded that there is a significant increase in students' science literacy following the implementation of LKPDs based on the local wisdom of the Kajang community through the CRT approach in class VII.5 at SMPN 1 Bulukumba, South Sulawesi.

3.2 Discussion

The research was conducted at SMPN 1 Bulukumba, Bulukumba Regency, South Sulawesi, from May 20 to June 5, during the even semester. The objective of this study was to ascertain the extent of improvement in science literacy among seventh-grade students at SMPN 1 Bulukumba following the implementation of Local Wisdom-Based Student Worksheets (LKPD) utilizing the CRT approach. The sample for this study consisted of one class, VII.5, comprising a total of 30 students.

Before the learning process begins, students are given a pretest to assess their science literacy scores prior to receiving local wisdom-based worksheets from the Kajang community through the CRT approach. The learning process continues over four sessions with four topics: the first session covers the impact of the environment on an organism, the second discusses interactions among ecosystem components, the third compares

Indonesia's biodiversity with other parts of the world, and the fourth addresses human impacts on ecosystems and biodiversity conservation. At the end of the study, a posttest is administered to determine the students' science literacy scores after the local wisdom-based worksheets. During the lessons, students are divided into four groups, each consisting of seven or eight students, with a total of 30 participants. Each group is provided with worksheets and guided to complete them.

When working on the LKPD, the researcher observed that there were some students who quickly understood the material, while others needed a lot of explanations and assistance in completing the tasks. Additionally, the researcher faced challenges during the learning process, such as several students lacking internet data to access the barcodes on the LKPD. Furthermore, some students were difficult to manage during the lesson.

As evidenced in Table 4.1, the mean science literacy score of students prior to the introduction of a local wisdom-based LKPD through the CRT approach was 7.63, which is classified as low. Following the implementation, the mean score increased to 13.10, indicating a high level of proficiency. The data demonstrate an increase in pretest and posttest scores, indicating that students exhibited enhanced science literacy following the implementation of the local wisdom-based LKPD through the CRT approach. This finding aligns with the research conducted by [40], which demonstrated the efficacy of local wisdom-based teaching tools in enhancing science literacy within the context of science education.

The N-Gain results of students' science literacy is 0.46, which falls into the moderate category. In Table 4.4, the frequency of students with a high N-Gain category is 1 student, 22 students are in the moderate category, and 7 students are in the low category. This indicates that the local wisdom-based LKPD of the Kajang community through the CRT approach effectively enhances students' science literacy. This is consistent with the findings of research conducted by **[**33], which states that the local wisdom-based CRT approach can improve students' science literacy.

The N-Gain achievement for each science literacy indicator among the student population is outlined below:

Explaining Scientific Phenomena. The indicator explains the scientific phenomenon that students must be able to recall relevant information in specific situations and use it to interpret and explain interesting phenomena. As evidenced in Table 4.6, the N-Gain analysis results for the indicator elucidating scientific phenomena demonstrate the most substantial improvement, with an N-Gain score of 0.61. Nevertheless, this falls within the moderate category. This is due to the LKPD (Student Worksheets) completed by students in each session, which connects community indigenous knowledge with scientific knowledge, particularly in the stimulus section that represents the culturally understanding stage in the CRT approach. It presents problems that contain cultural elements from the Kajang community and relates to the material on ecology and Indonesia's biodiversity. This connection helps students better understand and remember scientific concepts because they can relate them to their real-life experiences.

In line with the research by [41], [42], it is stated that local wisdom-based learning can enable students to connect real knowledge with theory, making it easier for them to accept the learning process. Moreover, using local wisdom-based LKPD learning

sources provides students with experiences to link surrounding phenomena with the material, allowing them to draw conclusions based on evidence related to science. Additionally, among the three science literacy indicators, questions that require explaining phenomena scientifically are the easiest for students to understand. This occurs because questions in this indicator require students to recall and recognize a scientific phenomenon relevant to a specific situation, thus enabling them to connect it with everyday life phenomena [43], [44].

Design and Evaluate Scientific Investigations. The indicators for designing and evaluating scientific investigations entail elucidating and appraising scientific findings, in addition to proposing methodologies for addressing questions from a scientific perspective. As illustrated in Table 4.6, the N-Gain analysis results for the indicators of designing and evaluating scientific investigations yield a score of 0.30, which falls within the moderate category. This is due to the fact that the implementation of the Student Worksheet (LKPD) during the data processing stage involves a CRT phase, which encourages students to engage in critical reflection and analyze the environmental impact of local cultural practices, specifically the local wisdom of the Kajang community. The learning process places an emphasis on students formulating problems and finding solutions related to the local wisdom of the Kajang community or aligning with their real-life experiences. This approach trains students in critical thinking, equipping them with the skills to design and evaluate scientific investigations.

This aligns with the research by [45], which states that learning using student worksheets that integrate local wisdom can enrich students' learning experiences and enhance their skills in conducting scientific investigations. Additionally, the questions used in this indicator connect students' cognitive aspects with local wisdom and events commonly encountered in daily life. This indicator requires students to understand and evaluate a scientific investigation and determine the steps to answer questions scientifically. Students' abilities in this indicator are related to the scientific knowledge they understand in connection with basic science concepts [46].

Interpret Data and Evidence Scientifically. The indicator for interpreting data and evidence scientifically is that students can interpret scientific data and evidence and communicate it to others in their own words, which may include diagrams, graphs, and other appropriate representations. In essence, students must be able to discern the logical relationship, or lack thereof, between evidence and conclusions. As evidenced by Table 4.6, the N-Gain analysis of the indicator pertaining to the interpretation of data and evidence in a scientific context yielded a score of 0.26, which falls within the low range. With respect to this indicator, students evinced the least developed science literacy skills of the three indicators. This is due to the fact that in the LKPD (Student Worksheet) completed by students during the data collection and verification stages, which are also stages of collaboration and transformative construction in the CRT approach, students demonstrated a lack of seriousness in the learning process. Furthermore, some students demonstrated a reluctance to engage actively in group work, which hindered their capacity to effectively convey their ideas and scientific findings. More-

over, students are accustomed to working on questions in the form of readings or discourses, which impairs their ability to draw appropriate conclusions from data presented in tables or graphs.

In alignment with the findings of [47], it is evident that the indicators of data interpretation and scientific validation are ranked lowest among the other indicators. This is because students are not solely reliant on memorization skills; rather, they must demonstrate the ability to analyze in order to gain understanding and to formulate arguments or conclusions in order to solve the problems presented. The research conducted by [48] also indicates that the ability to argue in student collaboration can foster an understanding of the science process and improve learning outcomes. Therefore, to enhance their science literacy, students also need to collaborate with their peers.

To reinforce the findings of the descriptive analysis, an inferential statistical analysis was conducted to evaluate the proposed hypothesis using the Paired Sample T-test. Prior to conducting the paired sample t-test, a normality test was performed on the pretest and posttest science literacy scores of the students using the Shapiro-Wilk test to ascertain the distribution of the data. Table 4.7 illustrates that the normality test for the science literacy of seventh-grade students (class VII.5) yielded significance values (Sig.) of 0.398 for the pretest and 0.159 for the posttest. The results of the Shapiro-Wilk test indicate that the significance values for both the pretest and posttest are greater than 0.05, thereby allowing us to conclude that the data from the aforementioned tests are normally distributed.

Furthermore, the results of the hypothesis testing in class VII.5 conducted using the Paired Sample T-Test, yielded a significance level of $\alpha = 0.05$ and degrees of freedom (df) of df = N-1 = 30-1 = 29, resulting in a t_{table} value of 1.699. The analysis of science literacy yielded a t_{count} value of $11.840 > t_{table} = 1.699$. This means H_0 is rejected and H_1 is accepted. It can be concluded that there is a significant improvement in students' science literacy subsequent to the implementation of a local wisdom-based LKPD from the Kajang community through the CRT approach in class VII.5 at SMPN 1 Bulukumba, South Sulawesi. This aligns with [25] research, which states that local wisdom-based LKPD is effective in enhancing students' science literacy. Additionally, research by [34]) also indicates that the CRT approach can improve students' science literacy.

4 Conclusion

Based on the findings of the research and the subsequent discourse, the following conclusions can be drawn:

- The level of science literacy of seventh-grade students in SMPN 1 Bulukumba before the implementation of local wisdom-based LKPD through the Culturally Responsive Teaching (CRT) approach was categorized as low with a score of 7.63. After the implementation, it improved to a high category with a score of 13.10.
- The increase in science literacy of seventh-grade students in SMPN 1 Bulukumba through the implementation of local wisdom-based LKPD via the Culturally Responsive Teaching (CRT) approach resulted in an average N-Gain of 0.46, which is categorized as moderate.

- There was a significant improvement in the science literacy of seventh-grade students in SMPN 1 Bulukumba after the implementation of local wisdom-based LKPD through the Culturally Responsive Teaching (CRT) approach, as indicated by the t-test results showing that H_0 was rejected and H_1 was accepted.

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