



Analysis of Science Literacy Skills Among 11th Grade Students on Kinematics Material

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Abstract

This is survey research aimed at determining the profile of science literacy skills among XI students at State High School 4 Makassar on learning physics in general and based on gender. The population in this study is the entire Class XI of physics students at State High School 4 in Makassar school year 2023/2024 of 3 classes, while the sample of 68 students was selected using purposive sampling. The instruments used in this research to measure the content, knowledge, and competency dimensions were tests, while the attitude dimension was measured using a questionnaire. The data obtained from this research were analyzed using descriptive statistics. The research results showed that the literacy of the scientists in the context and knowledge dimensions was in the middle category, the competence dimensions were in the lower category, and the attitude dimensions were in the high category. When reviewed from a gender perspective, the average literacy score of female students is superior in context implications, while male students are superior in knowledge, competence, and attitude.

Keywords: gender; kinematics; literacy of science

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INTRODUCTION

Education in the 21st century is accompanied by rapid advancements in science and technology, enabling every task to be easily accomplished with the assistance of technology. These developments are also one of the distinguishing characteristics of the 21st century compared to previous centuries (Ghafar, 2020; Graham, 2020; Pérez & Montoya, 2022).

Various changes have occurred, including technological advancements, strengthening international ties, changes

in societal life styles, and globalization (Pertiwi et al., 2018). 21st century learning demands that teachers are capable of developing learning activities with various innovations that utilize information technology. The challenges in education due to rapid advancements in technology include the increasing demand for literacy skills. Teachers must be able to manage literacy-based science learning to equip students with life skills to adapt to their environment (Apriyani et al., 2021; Kasse & Atmojo, 2022; Nasor et al., 2023).



The key to facing the challenges of the 21st century is scientific literacy. Knowledge of science and technology equips individuals with the ability to use their knowledge to make decisions and solve problems encountered in daily life. Scientific literacy is not only factual knowledge but also the ability to apply science to create positive change. Scientific literacy can shape individuals with character, mindset, and behavior, thereby increasing their concern and sense of responsibility for themselves, their communities, the environment, and societal problems. This indicates that scientific knowledge has a significant impact on individuals' personal and social lives. Therefore, learning activities should be oriented towards improving scientific literacy (Fananta et al., 2017; Jufrida et al., 2019; Sinaga et al., 2019; Valladares, 2021).

In light of the significance of science literacy, it is necessary to measure the level of science literacy among students to assess their competencies after studying scientific concepts. The measurement of scientific literacy among Indonesian learners has been frequently conducted using assessments such as PISA. However, the results obtained from these assessments are universally applicable. Thus, there is a need for more significant small-scale measurements of scientific literacy (Pratiwi et al., 2019).

Based on the PISA test results from 2000 to 2022, Indonesia is still classified as a country with low levels of scientific literacy. Even the latest data obtained from the PISA 2022 test shows that the average score of Indonesian learners in the field of science is the lowest among several previous tests, amounting to only 366. This score is still below the OECD country average of 472 points (OECD, 2023).

There are several factors that can contribute to low levels of science literacy skills, which can stem from internal or external factors of learners (Balgan et al.,

2022; Jayawardena et al., 2020). Internal factors may include interests, motivation, attitudes, learning styles, talents, personality, or others. External factors may be influenced by family, school, or the environment. Gender differences also affect one of the internal factors, which is talent. Factors from the school and the characteristics of the students are closely related in providing better science literacy outcomes (Ding, 2022; Zuhara et al., 2019). The PISA test results indicate a significant difference in science literacy between male and female students.

State High School 4 Makassar is one of the best high schools in Makassar and serves as a pioneering institution. It can be said that State High School 4 Makassar sets the benchmark for other schools in Makassar. This research is expected to contribute to a more comprehensive understanding of science literacy, not only in the specific State High School 4 Makassar students but also high school in Makassar in general.

As science and technology advance, mastering literacy in reading, mathematics, and science has become a crucial aspect that must be considered. An interview conducted with a physics teacher at State High School 4 Makassar revealed that the teacher has implemented teaching activities aimed at enhancing students' scientific literacy. One of these activities involves frequently engaging students in scientific investigations such as simulations, practical work, demonstrations, and physics projects. In addition, the teacher also makes regular use of technology, both in teaching and scientific inquiry. This scientific approach is believed to improve students' science literacy skills, particularly in the subject of Physics (Nurfadhilah et al., 2023). Therefore, it is necessary to analyze students' science literacy skills at this school.

This study also evaluates the differences in students' science literacy abilities with respect to gender. Research

on science literacy based on gender has been frequently conducted before. For instance, a study by Allo, Nurhayati, and Subaer (2023) showed that male students scored higher than female students on most indicators of science literacy. Research by Rum et al. (2023) focused on students' science literacy abilities in the domain of attitudes, yielding positive results. A study by Herianingtyas et al. (2023) found that, from the test results on eight indicators of science literacy, male students performed better than female students in the content dimension (factual, conceptual, procedural, and epistemic content) and the competency dimension. Research by (Safar et al., 2023) indicated that, on the context dimension, which typically involves reading comprehension questions, female students scored higher. However, studies examining gender differences in science literacy have only focused on certain dimensions. Therefore, this study analyzes all four aspects of science literacy to provide a complete and comprehensive result.

METHOD

This research employed a quantitative descriptive survey method. Descriptive research includes various types of surveys and searches that emphasize facts with the main purpose of accurately describing the current situation and characteristics of the research object. In this method, the researchers did not apply treatment to variables or subjects. Data collection uses test instruments or questionnaires (Bhome et al., 2013; Singh, 2006). The research population consisted of all eleventh-grade students at SMAN 4 Makassar. Using purposive sampling technique and calculating the Slovin statistical formula with a precision value of 95% and a significance level of 5%, the average sample size to be used was ± 23 students from representatives of 3 classes. The research instrument is based on the 2015 PISA framework,

which has been developed from the previous framework with four main dimensions: context, knowledge, competence, and attitude (Istyadji & Sauqina, 2023; Suprayitno, 2019). Two types of instruments were used: multiple-choice test items to measure students' science literacy abilities for the dimensions of context, knowledge, and competence. Meanwhile, for the attitude dimension, it was measured using a questionnaire. The instruments were developed from the PISA survey in four dimensions.

Descriptive analysis includes mean, variance, and frequency distribution tables as elaborated below (Darwin & Al, 2021). To measure scientific literacy abilities based on four dimensions, namely the context dimension which includes various issues from the personal to the global level; the knowledge dimension, which encompasses content, procedural, and epistemic knowledge; the competence dimension, which consists of explaining phenomena scientifically, evaluating and designing scientific investigations, and interpreting data and evidence scientifically; and the attitude dimension, which includes interest in science, support for scientific inquiry, and responsibility towards resources and the environment. Skills data were collected through a 30-item test and 15 non-test items. Next, the test scores were calculated used binary format, assigning a score 1 to correct answers and 0 to incorrect ones. As for the non-test items, scores are given based on the scoring pattern by (Sugiyono, 2013) as follows in Table 1.

Table 1 Scoring pattern for students' scientific literacy attitude scale

Scoring Standard	SA	A	D	SD
Statement (positive)	4	3	2	1
Statement (negative)	1	2	3	4

Explanation:

SA : Strongly Agree

A : Agree

D : Disagree
 SD : Strongly Disagree

The final score of each student was then categorized into three categories due to the small range of score acquisition (Azwar, 2012). Criteria for Interpreting Students' Scientific Literacy Scores can be seen in Table 2:

Table 2 Criteria for interpreting students' scientific literacy scores

Score	Category
$\mu + 1\sigma \leq X$	High
$\mu - 1\sigma \leq X < \mu + 1\sigma$	Medium
$X < \mu - 1\sigma$	Low

RESULTS AND DISCUSSION

Context dimension

The following is an overview of the scientific literacy skills of Physics class XI students at State High School 4 Makassar for the 2023/2024 academic year in the context dimension (Table 3).

Table 3 Statistics of scientific literacy skills in the context dimension

Statistic	Score
Research Sample	68
Highest Score ideal	6
Lowest Score ideal	0
Highest Score empiric	4
Lowest Score empiric	0
Average	2.21
Standard Deviation	0.98

Table 3 shows the students' average science literacy scores on the context dimension: 2.21. The highest score is 4, while the lowest is 0, with a standard deviation of 0.98.

Percentage of students in the context dimension can be seen in Table 4.

Table 4 Categorization of students' scientific literacy skills in the context dimension

Interval	Category	Percentage (%)
≥ 4	High	7.35
$2 \leq x < 4$	Medium	69.12
< 2	Low	23.53

The data presented in Table 4 reveals that a significant proportion of students—69.12%—exhibited moderate levels of science literacy. A smaller proportion, 7.35%, demonstrated high levels, while 23.53% were classified as low.

This phenomenon suggests that students' science literacy competencies remain predominantly at a moderate level, particularly within the context dimension. The relatively low scores observed among some students indicate an insufficient depth of understanding regarding scientific issues within a broader context.

In light of several previous research measuring science literacy, the findings of this research are consistent with those of (Utami et al., 2022), which assessed students' science literacy in the context dimension within the field of biology. Their study found an average score of 64.50%, categorizing it as moderate. Similarly, research by Ning, Roshayanti, and Siswanto (2020) reported a score of 2.5, or 64%, across the personal, local, and global aspects, which was classified as adequate. These findings are in accordance with the results of the current study, where the lower scores suggest discrepancies in science literacy outcomes related to contextual comprehension across various research locations. Such disparities may be attributed to differences in curricula or instructional approaches employed in the educational settings of the respective schools.

Knowledge dimension

The finding of literacy science test concerning the knowledge dimension. Statistics of scientific literacy skills in the knowledge dimension in Table 5.

Table 5 Statistics of scientific literacy skills in the knowledge dimension

Statistic	Score
Research Sample	68
Highest Score ideal	9

Lowest Score ideal	0
Highest Score empiric	7
Lowest Score empiric	0
Average	3.09
Standard Deviation	1.31

Table 5 shows that the average score obtained by students on the knowledge dimension was 3.09. The highest score obtained was 7, while the lowest was 0, with a standard deviation 1.31.

Table 6 Categorization of students' scientific literacy skills in the knowledge dimension

Interval	Category	Percentage (%)
≥ 6	High	2.94
$3 \leq x < 6$	Medium	63.24
< 3	Low	33.82

On the knowledge dimension, the most significant percentage of students, 63.24%, fell into the moderate category. Only 2.94% were categorized as high, while the remaining 33.82% were classified as low. The results indicate that most students exhibit a moderate level of science literacy, and a minority of students demonstrate advanced science literacy.

This result indicates that the scientific knowledge of the majority of students is still at a moderate level. A similar finding was reported by Randan, Husain, and Allo (2022) for eleventh-grade students of the MIPA 1 class at SMA Negeri 4 Toraja Utara, who achieved an average score of 60.03% in the "adequate" category. This suggests that while they possess basic knowledge of scientific concepts, they still struggle to connect this knowledge to more complex situations and practical applications. This is further evidenced by the research of Zulaiha and Kusuma (2021), which demonstrated that students' science literacy skills in procedural knowledge indicators were in the very low category. This indicates the need for improvement in the learning process, such as conducting experiments or observations

in school, which can familiarize students with performing scientific procedures and applying conceptual knowledge to analyze complex information.

Competency dimension

The competency dimension as evaluated using the test instrument, reveals the following regarding students' science literacy (Table 7).

Table 7 Statistics of scientific literacy skills in the competency dimension

Statistic	Score
Research Sample	68
Highest Score ideal	15
Lowest Score ideal	0
Highest Score empiric	10
Lowest Score empiric	1
Average	4.59
Standard Deviation	2.02

Table 7 shows that the average score of students in this dimension is very low, at only 4.59. A maximum score of 10 and a minimum score of 1, with a standard deviation of 2.02.

Table 8 Categorization of students' scientific literacy skills in the competency dimension

Interval	Category	Percentage (%)
≥ 10	High	2.94
$5 \leq x < 10$	Medium	47.06
< 5	Low	50.00

Table 8 shows the results for competency. A significant proportion of participants, 20.00%, fell into the low category. Only a small percentage, 2.94%, demonstrated a high level. The competency dimension posed the most significant challenge for participants.

The research findings indicate that a small number of students are able to achieve adequate scores in this dimension, yet the majority of students still difficulties in developing their skills. Furthermore, there is a significant disparity between students at the lower levels of competence and those at higher

achievement levels. This aligns with several previous studies, where the competence dimension is considered the least mastered by students. Research by Permatasari (2022) and Tulaiya and Wasis (2020), both of which yielded results below 50%, further supports this notion. These results suggest a lack of connection between science learning and real-life applications (Setiawani et al., 2021), leading to low levels of conceptual understanding and the application of scientific knowledge.

Attitude dimension

The following is an overview of students' science literacy abilities in the attitude dimension, as measured by a questionnaire (Table 9).

Table 9 Statistics of scientific literacy skills in the attitude dimension

Statistic	Score
Research Sample	68
Highest Score ideal	60
Lowest Score ideal	15
Highest Score empiric	59
Lowest Score empiric	35
Average	46.34
Standard Deviation	5.45

Based on Table 9, the average score obtained by the participants was relatively high, at 46,34. The lowest score was 35, while the highest score was nearly the ideal score, 59, with a standard deviation of 5,45.

Table 10 Categorization of students' scientific literacy skills in the attitude dimension

Interval	Category	Percentage (%)
≥ 10	High	93.75
$5 \leq x < 10$	Medium	6.25
< 5	Low	0.00

The results, shown in Table 10, consistently demonstrate a high level of performance. No students exhibited low performance on this dimension. A majority of 93,75% of students achieved high scores.

The data indicate that the majority of students demonstrate optimal performance in this dimension, with no students exhibiting low levels of achievement. The absence of students with low performance suggests that most students are able to reach optimal levels of performance in this dimension. This finding reflects a high level of interest and motivation in learning science. A study by (Rum et al., 2023) specifically explores the attitude dimension in science literacy, with indicators such as support for scientific inquiry, interest in science, and responsibility toward resources and the environment. The research findings indicate that, overall, students' attitudes toward science fall within a high category.

Overview of Scientific Literacy Skill Scores based on Gender

Context dimension

The following is an overview of the scientific literacy skills of physics class XI students at State High School 4 Makassar for the 2023/2024 academic year in the context dimension based on gender (Table 11).

Table 11 Statistics of scientific literacy skills based on gender in the context dimension

Statistic	Score	
	Female	Male
Research Sample	38	30
Highest Score ideal	6	6
Lowest Score ideal	0	0
Highest Score empiric	4	4
Lowest Score empiric	0	0
Average	2.24	2.17
Standard Deviation	0.91	1.08

Based on Table 11 compares the average scores of scientific literacy skills between female and male students in Physics class XI at State High School 4 Makassar for the context dimension. Based on the figure, the average score of female students is 2.24, while male students score 2.17. Thus, it can be concluded that the scientific literacy

skills of female students are higher than those of male students.

The results indicate that female students exhibit slightly higher science literacy skills compared to male students in the context of Physics material. The questions used for measurement, which involved reading-based contexts, suggest that female students are better at understanding, interpreting, and drawing conclusions from the issues presented based on the information provided in the text. These findings align with the 2018 PISA report, which stated that, in the reading domain, the proportion of female students at level 2 and above was higher than that of male students (OECD, 2019).

Knowledge Dimension

The following is an overview of the scientific literacy skills of Physics class XI students at State High School 4 Makassar in the knowledge dimension based on gender for the 2023/2024 academic year (Table 12).

Table 12 Statistics of scientific literacy skills based on gender in the knowledge dimension

Statistic	Score	
	Female	Male
Research Sample	38	30
Highest Score ideal	10	10
Lowest Score ideal	0	0
Highest Score empiric	7	6
Lowest Score empiric	1	0
Average	3.00	3.20
Standard Deviation	1.14	1.52

Table 12 shows that the average score of female students' scientific literacy skills test results in Physics class XI is 3.00, while the average score of male students' scientific literacy skills test results is 3.20. The highest score obtained by female students is 7, and the highest score obtained by male students is 6, while the lowest score obtained by female students is 1, and the lowest score obtained by male students is 0.

These findings indicate that the average scores of male students are

higher than those of female students in the dimension of knowledge. This is supported by the study of Herianingtyas et al. (2023), which shows that male students have higher science literacy levels compared to female students in the content dimension (factual, conceptual, procedural, and epistemic content). Factors such as teaching approaches, learning motivation, and differing learning styles between males and females may influence their science literacy outcomes.

Competency Dimension

The following is an overview of the scientific literacy skills of Physics class XI students at State High School 4 Makassar for the 2023/2024 academic year in the competency dimension based on gender (Table 13).

Table 13 Statistics of scientific literacy skills based on gender in the competency dimension

Statistic	Score	
	Female	Male
Research Sample	38	30
Highest Score ideal	15	15
Lowest Score ideal	0	0
Highest Score empiric	10	9
Lowest Score empiric	1	2
Average	4.55	4.63
Standard Deviation	2.38	1.47

Table 13 shows that the average score of female students' scientific literacy skills test results in Physics class XI is 4,55, while the average score of male students' scientific literacy skills test results is 4,63. The highest score obtained by female students is 10, and the highest score obtained by male students is 9. The lowest score obtained by female students is 1, and the lowest score obtained by male students is 2.

This finding indicates that although the average scores of male students are slightly higher, the difference between female and male students is not particularly significant, and there is considerable variation within both

groups. The study by Safar et al. (2023) on elementary school and Madrasah Ibtidaiyah students, based on learning styles and gender, also shows that the average science literacy score for male students (59,52) is higher than that of female students (58,68), indicating an insignificant difference. However, this contrasts with the findings of Nurazizah et al. (2022), who conducted a study on the science literacy abilities of middle school students based on gender using the STEM model. The results showed that the average percentage for female students was 81%, categorized as high, while male students averaged 69%, categorized as medium. These results are highly dependent on the test context, the types of questions posed, the learning approach, and the educational level of the research subjects.

Attitude Dimension

The following is an overview of the scientific literacy skills of Physics class XI students at State High School 4 Makassar for the 2023/2024 academic year in the attitude dimension based on gender (Table 14).

Table 14 Statistics of scientific literacy skills based on gender in the attitude dimension

Statistic	Score	
	Female	Male
Research Sample	38	30
Highest Score ideal	60	60
Lowest Score ideal	15	15
Highest Score empiric	56	60
Lowest Score empiric	35	37
Average	46.31	46.4
Standard Deviation	5.40	5.67

Table 14 shows that the average score of female students' scientific literacy skills test results in Physics class XI is 46,31, while the average score of male students' scientific literacy skills test results is 46,4. The highest score obtained by female students is 56, and the highest score obtained by male students is 60. The lowest score obtained by female

students is 35, and the lowest score obtained by male students is 37.

These findings indicate that male students outperform female students. However, the difference in the average scores between males and females is minimal. This is consistent with the findings of Iwuanyanwu (2022), which revealed that, overall, students' attitudes toward science based on gender show varied results, with male students displaying more positive attitudes toward science than female students. This small difference suggests a tendency for male students to be more interested and confident in their attitudes toward science, which may influence their overall science literacy abilities, even though the effect is not significant.

Interpretation

The analysis of each dimension revealed that the science literacy of student at State High School 4 Makassar generally low in the competency dimension, moderate in the knowledge amd context dimensions, and high in the attitude dimension.

Several previous studies on scientific literacy skills have been conducted and yielded findings consistent with those of this research. For instance, a study by Utami et al. (2022) on the context dimension in the field of biology obtained an average score of 64.50%, which falls into the moderate category. Similarly, studies by Ning et al. (2020) on personal, local, and global aspects yielded scores of 2.5 or 64% in the sufficient category. Furthermore, a study by Randan et al. (2022) obtained an average score of 60.03% in the sufficient category. This is supported by a study by Rum et al. (2023), which examined students' scientific literacy skills specifically in the attitude domain and obtained positive results. This research is based on four attitude indicators towards science, including support for scientific inquiry at 68.92%, interest and

responsibility towards resources and the environment at 72.06%, motivation and involvement in science at 65%, and students' confidence in science at 69.86%. However, the competency dimension is the least mastered by the students. Research by Permatasari (2022) and Tulaiya & Wasis (2020), both of which obtained results below 50% and are still considered low.

According to Yusmar & Fadilah (2023), factors causing low scientific literacy skills among students include students, educators, and schools. Student factors are often attributed to a reluctance to ask questions, even when they do not fully understand the teacher's explanation of basic science concepts and cannot relate these concepts to everyday phenomena. Conventional teaching methods, students' inability to accurately interpret graphs or tables, and a lack of literacy and writing skills, particularly in comprehending or reviewing learning materials, also contribute to this. Furthermore, the instruction provided by teachers often fails to train students in answering science literacy questions and remains focused on mastering content rather than developing inquiry skills and conceptual understanding, which are fundamental to science literacy. This is because teachers' ability to facilitate learning significantly influences students' ability to solve scientific problems. Additionally, inadequate school facilities can lead to low science literacy among students. Other literature has identified additional factors contributing to low student achievement, including the approach and media used in teaching, the insufficiency of textbooks in accommodating students' needs for science literacy content, non-contextualized learning or the selection of inappropriate learning models, student misconceptions, low reading ability, learning environment and climate and poor school management, incomplete school infrastructure, and the quality of

human resources (Amala et al., 2023; Suparya et al., 2022; Wahyu & Al., 2020).

In the context dimension, students' difficulties in answering test questions are attributed to their lack of literacy/reading skills. Competency dimension questions cover personal, social, and global aspects. These questions are presented in the form of readings related to phenomena in these three aspects, requiring students to solve problems by observing the information presented in the text. The majority of students can only answer less than 50% of the questions correctly. Three out of 68 students provided incorrect answers to all questions. Therefore, there is still a need to strengthen students' literacy skills in understanding readings.

In the knowledge dimension, questions are posed in the form of content, procedural, and epistemic knowledge questions. It is evident that students are less capable of solving procedural knowledge questions, with only 9 out of 68 students providing correct answers to two procedural knowledge questions. This relates to the implementation of experimental learning at schools. Although students are frequently involved in scientific activities such as experiments and observations, they still struggle to analyze experimental results, such as proving hypotheses and drawing conclusions from experiments conducted. This is consistent with the research by Zulaiha & Kusuma (2021), which showed that students' skills in procedural knowledge indicators are very low. The low achievement is due to students' inability to analyze complex information presented, making it difficult to justify explanations of a phenomenon using scientific concepts.

In the competency dimension, questions encompass explaining phenomena scientifically, evaluating and designing scientific inquiries, and

interpreting data and evidence scientifically. Based on the test results, students still have low abilities in explaining phenomena scientifically. This is evident from the lack of students who can answer questions correctly in this aspect. These results indicate a low level of contextual understanding among students, which can occur when the learning process solely emphasizes memorization and comprehension of concepts, theories, or laws. Consequently (Haruna & Al, 2024; Jufrida et al., 2019).

Regarding the attitude dimension, which includes support for scientific inquiry, interest in science, and responsibility towards resources and the environment, the overall results show that students' attitude dimension is categorized as high. However, the survey results provide information regarding students' high interest in science and scientific inquiry. Nevertheless, in the third aspect, students still demonstrate a lack of responsibility.

In terms of gender differences in each dimension, it is found that the average literacy scores of male students excel over female students in several dimensions. Male students perform better in the knowledge, competency, and attitude dimensions. Meanwhile, female students excel in the context dimension. This indicates that female students have better reading comprehension skills, while male students excel in mathematical calculations and reasoning. This is supported by the research of Herianingtyas et al. (2023), which shows that male students have a higher level of scientific literacy compared to females in content (factual, conceptual, procedural, and epistemic content) and competency dimensions. Other research focusing on the competence dimension also indicates that male students achieved higher average scores on this dimension compared to female students (Baltikian et al., 2024; Safar et al., 2023). On the other hand, in the context dimension, which

mainly consists of reading comprehension questions, female students obtain higher scores. This may be because females are better at reading than males. This finding is consistent with the PISA 2018 report, which states that in the field of reading, the proportion of female students at level 2 and above is higher than male students.

According to Hadiyanto & Suyadi (2023), boys and girls have different brain structures that affect their learning methods. Boys generally learn using graphics, images, or physical activities such as assembling, designing, practicing, simulating, and so on. As children grow older, they will predominantly use the right brain to understand ideas or creativity that emerges. Meanwhile, girls are faster in language acquisition than boys. This makes them easily understand concepts simply by reading, writing, speaking, discussing, or through drama and theater.

Statistical analysis revealed no significant difference in the mean science literacy scores between male and female students. This is in line with the results of the report on Indonesian students' scientific literacy skills in the PISA test, where in the fields of mathematics and science, the proportion of high and low competency levels between male and female students is relatively equal. Female students slightly excel only in the last two rounds of mathematics and the last four rounds of science (Kiliç et al., 2022; Suprayitno, 2019).

This research provides an overview of students' science literacy skills, which are still considered low, particularly in the dimensions of context, knowledge, and competency. This indicates the need for improvements in the learning process through a more comprehensive and contextual approach, so that students not only understand scientific concepts but also can apply science in their lives. Additionally, this study shows differences in abilities between male and

female students in several dimensions. Males tend to excel in the dimensions of knowledge, competency, and attitudes, while females perform better in the context dimension. This can serve as a basis for designing learning approaches that are more specific to gender characteristics. However, this study has not further identified other factors that may influence students' science literacy abilities. Therefore, further research that considers these factors may provide a more holistic perspective.

CONCLUSION

The data obtained from this research support the conclusions that: (1) The scientific literacy skills of 11th-grade Physics students at SMA Negeri 4 Makassar, based on categorization results in each dimension, indicate that students' scientific literacy in the context and knowledge dimensions is at a moderate level, while in the competency dimension, it is at a low level. Meanwhile, in the attitude dimension, students' scientific literacy skills are categorized as high; (2) In terms of gender aspects, the average scores of female students' literacy skills excel in the context implications, while male students excel in the knowledge, competency, and attitude implications.

However, this research only describes the science literacy skills of students based on the results of test in the field of physics. Therefore, further research is expected to be able to analyze more deeply related to the factors that cause the low science literacy skill of student and applied the methods to improve it.

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