

## Abstract of Manuscript Sugiarti

RSAD BAHRI, S.Pd., M.Pd. UNM <arsad.bahri@unm.ac.id>  
epada: Committee ICMSTR 2019 FMIPA UNM <icsmtr2019@unm.ac.id>

1 Oktober 2019 21.5!

Dear Commitee,

Here I attach the abstract of manuscript with the tittle "Correlation between Teacher Guidance and Parent with Chemistry Literation Ability of Students

Sincerely Yours,

Arsad Bahri

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Jurusan Biologi  
Fakultas Matematika dan Ilmu Pengetahuan Alam  
Universitas Negeri Makassar

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**Letter of Acceptance**

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epada: ARSAD BAHRI, S.Pd., M.Pd. UNM <arsad.bahri@unm.ac.id>

8 Oktober 2019 11.1:

Dear Mr. Arsad Bahri,

Thank you for sending us your abstract. Please find the LoA as attached.

Regards,  
The Committee

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Here I attached the full paper of Sugiarti



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epada: ARSAD BAHRI, S.Pd., M.Pd. UNM <arsad.bahri@unm.ac.id>

10 November 2019 10.03

Dear Mr. Arsad Bahri,  
Please find the reviewer comment for your paper as attached. Send back your revision of the manuscript up to  
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Regards,

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23 November 2019 14.35

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# The 3<sup>rd</sup> International Conference on Statistics, Mathematics, Teaching and Research 2019

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Tuesday, October 08, 2019

Dear Prof./Dr./Mr./Mrs. **Sugiart, U. Mulbar, Adnan, and A. Bahri,**

May God bless you with good health.

Congratulations. On behalf of the committee, we are pleased to inform that your abstract is **ACCEPTED** to be presented at The 3<sup>rd</sup> International Conference on Statistics, Mathematics, Teaching, and Research (ICSMTR) 2019, scheduled on October 9-10, 2019 at Claro Hotel, Makassar, Indonesia.

Ref. Num : ICSMTR/2019/101

Title : **Correlation between Teacher Guidance and Parent with Chemistry Literation Ability of Students**

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Thank you very much for your participation and we are looking forward to seeing you in Makassar on October 9-10, 2019.

Your sincerely,  
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**Dr. Ruliana, S.Pd., M.Si.**

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# **Correlation Between Teacher Guidance and Parent with Chemistry Literation Ability of Student**

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**Abstract.** This research was a quantitative descriptive study that aims to find out the chemical literacy ability, form of teacher and parent guidance, correlation between teacher and parent guidance on literacy chemical of second grade student in Junior High School on atomic, ionic, and molecular topic. The research sample of 234 students was taken by simple random for four schools at South Sulawesi. The design of this study is a survey research with the study population was all second grade student of Junior High School students in South Sulawesi. The ability of chemical literacy tested consists of the ability to understand the question methods that lead to scientific knowledge and the ability to organize, analyze and interpret quantitative data and scientific information with a total of 10 indicators. The instruments used included a questionnaire, and multiple choice test forms of 10 items that had been tested for validity and reliability. The provision of questionnaires aims to determine the role of teachers in the learning process at school and the role of parents in guiding students at home. The test is used to determine the literacy ability of students. Data were analyzed using quantitative descriptive statistics. The results of the data analysis found that average of the chemical literacy ability of Junior High School students in South Sulawesi is in the enough category. The mean of correlation between teacher guidance with students were high category, and the mean of correlation between parental guidance with students were enough category.

**Keywords:** literacy chemistry, teacher, parent, guidance, correlation, students junior high school

## **1. INTRODUCTION**

Indonesian students have participated in the international level to compete for quality of Indonesia in education field. Even though students from Indonesia were still in the low ranks of the PISA and TIMSS studies, but have tried their best so that the results of the Ministry of Education and Development Assessment and Education Center (Balitbang) Head of Education (2018) have recently stated obviously that sampling level of Indonesian students already increased in the PISA Test, starting in 2003, the achievement of students was only 46%, in 2006 it reached 53%, in 2012 increased to 63.4% and in 2015 it increased again to 68.2%. The PISA Exam System, it is directly determined by the OECD. This test is assessed on three competencies, namely reading, mathematics and science. Science competency achieved the biggest result according to data from 2012-2015

obtained from 382 points up to 403 points (position rises 6 ranks). However, the achievement of scientific literacy is still quite far from developed countries.

One of the many factors causing the ability of Indonesian scientific literacy is still low, is the teacher's guidance during the learning process. Those aspects consists of classroom management, direct involvement of students, learning models and methods using, conformity with the characteristics of teaching materials, discipline, and direct individual guidance. Teacher and parent guidance is needed and this support is very beneficial for students, especially in the form of teacher guidance that reaches out to all students in the classroom. It also include parents support in the form of intensive guidance to their children at home such as helping with assignment or homework and helping to solve problems faced by students. Effective teachers teach well as what the study results of (1) found a positive correlation between teacher efficacy and learning outcomes with sufficient categories (56.27%). Teachers who gave efficacy support to students also contribute a positive correlation  $r_{xy} = 0.414$  and  $p = 0,000$ , high teacher guidance made students' affective and efficacy contributions with total (17.2%). Similar to the findings of (2) that during learning process, teachers need to implement various types of motivation so that students can achieve good learning outcomes. According to him, different motivations affect learning outcomes to be good results. More emphasized by (3) which stated that the most influencing that dominantly affect learner's success is the teacher. They reported that a good, fair, flexible behavior of teachers, have interesting strategies for each learning and clear list of activities.

The guidance factor of parents (father and mother) to guide students at home in completing homework or when studying is one of the factors that needs serious attention and is carried out routinely with high quality time. (4) through his research found that parental support for academic achievement and self-concept for students has a positive effect. Through the support of teachers and parents in learning allows students to be able to improve the ability of chemical literacy. So far, students who take part in scientific literacy are still very few in numbers. This situation can affect globally the number of students and the achievement of PISA literacy for Indonesia which is still ranked sixth to eighth below (5). However, comparing the conditions of Indonesian scientific literacy with other countries that are members of the Organization for Economic Cooperation and Development (OECD) is considered inappropriate by (6). Countries with comparative results under the OECD's average, do not mean the quality of education is poor, "said education observer (7).

The survey result of several Junior High Schools in South Sulawesi, March 2019, showed there were difficulties in Junior High School students in terms of understanding scientific literacy at various levels and components. For example in atomic, ionic and molecular matter, the ability of students to communicate definitions or meanings with their own sentences is very difficult. Likewise in interpreting images and graphics that require association of concepts with understanding in drawing conclusions, it is very difficult. This is inherently with the results of the study (Ahmadi et.al, 2018) which stated that the difficulty of scientific literacy of students is nominal, conceptual and dimensional literacy for lower strata students, whereas students at upper strata, have difficulty in functional literacy (limited to concept understanding). Other research results on the implementation of the 2015 PISA framework literacy competency through lesson study (8).

The research's results on the literacy ability of chemical science on atomic, ionic and molecular materials also need to be revealed because this material is one of basics material that is sufficient to help students understand chemistry lessons at the next level. Chemical material is filled with symbolic letters that have special rules in reading it and need guidance to understand it. Understanding process requires guidance from teachers and parents effectively and continuously both at school and at home. Those guidance will make students become more interested in learning chemistry because they understand it well. (9) stated that chemistry lessons are indeed very difficult, but students who learn before learning begins at school apparently have an understanding of the chemistry concepts and core chemistry material. (10) found that the behavior of students towards chemistry is very good. One of them is due to significant supporting factors at home and teachers in learning chemistry.

Based on several references of research results above, that is the fact that the guidance of teachers and parents in learning chemistry can have a good impact on the ability of scientific literacy for students. This research try to raise a similar problem but in different topic namely atomic, ionic and molecular chemistry as the topic of basic material for chemical studies. More clearly this study is organized under the heading "Chemical literacy ability of Junior High School Students on atomic, ionic and molecular matter". Furthermore, the problem formulation is; 1) how is the intensity of teacher and parent guidance towards students on learning of atomic, ionic and molecular chemistry, 2) is there a correlation between teacher guidance and the literacy ability of Junior High School students in South Sulawesi, 3) is there a correlation between parent guidance with literacy skills of Junior High School students in South Sulawesi.

## 2. METHODS

This research design was a quantitative descriptive by describing teacher's guidance at school and guidance of parents at home in terms of helping their learning and task as an effort to clearly understand chemistry literacy. This research was conducted in June 2019 towards four cities and regencies with a total of four schools and seven classes as samples, namely Makassar City, Maros Regency, and Sinjai Regency.

This research was preceded by observing. Next prepare the data collection instrument in the form of interviews, students and teacher's questionnaires, and test sheets with atomic, ionic and molecular matter in the form of 10 multiple choices. The data obtained were analyzed descriptively for data on the type of teacher and parent guidance presented in a tabular form. Data for literacy ability includes the number of samples, the highest and lowest chemical literacy ability values, then analyzed quantitatively knowing the correlation between teacher guidance and parents using the Spearman Rank correlation formula.

Data in this study were collected through open interview techniques, questionnaires and multiple choice tests. Interviews were conducted to all science teachers in four schools of 22 teachers to gather information related to the ability of chemical literacy in atomic, ionic, and molecular materials. The questionnaire was distributed to 234 students to capture data on parental guidance at home. The form of parental guidance analyzed is guidance in doing homework, accompanying children while studying, and giving advice to study more diligently. The questionnaire for teachers solicits data about teacher guidance in the classroom which includes guidance in the form of homework feedback, daily exams feedback, and project feedback. The multiple choice test instrument consists of 10 items containing atomic, ionic and molecular matter. After obtaining student's score, the scores are grouped according to the criteria of learning outcome by Arikunto (2007): 80-100 (very good), 66-79 (good), 56-65 (enough), 40-55 (poor), < 39 (failed). While the value of Spearman Rank correlation according to (Guilford, 1956) : 0,8 - 1 (very high), 0,6 – 0,8 (high), 0,4 - 0,6 (enough), 0,2 – 0,4 (low), 0 – 0,2 (very low).

## 3. RESULTS AND DISCUSSIONS

This finding presented the results of descriptive and quantitative analysis of chemical literacy ability, the category of indicators attainment of chemical literacy ability, the results of analysis towards teacher guidance at school and the guidance of parents at home. Finally, the results of the correlation analysis between teacher and parent guidance with the ability of chemical literacy in each school's students.

**Table 1.** Descriptive Statistics of Student Ability of Chemistry Literacy

Descriptive Statistics	SMP 6 MAKASSAR	SMP 26 MAKASSAR	SMP 2 MAROS	SMP 4 SINJAI
Total sampel ( <i>n</i> )	62	53	60	59
Maximum score	60	40	50	70
Minimum score	0	0	0	10
Mean	26,48	23,6	23,95	32,7
Deviation standard	7,13	10,89	15,43	11,1

Based on Table 1, it can be seen that the highest value is 70, the lowest value is 0, with standard deviations varying from SD = 7.13 to SD = 15.43. The highest mean literacy ability is SMP 4 Sinjai district. The lowest grade point average occurs in five classes spread over three schools.

Continues with categorizing the achievement of literacy ability, intended to determine the distribution of literacy ability categories of students in the number and percentage of achievement. This information can be seen in Table 2.

**Table 2.** Student Category of Student Ability of Chemistry Literacy

Interval	Category	Junior High School				Student Amount	Percentage %
		6 Mks	26 Mks	2 Maros	4 Sinjai		
80-100	Very Good	0	0	0	0	0	0,00
66-79	Good	0	0	0	1	1	0,43
56-65	Enough	5	0	0	2	7	2,99
40-55	Poor	25	9	18	18	70	29,91
<40	Failed	32	44	42	38	156	66,67
Total		31	53	60	59	234	

Based on the data in Table 2, only one student attained the good category, namely students from SMPN 4 Sinjai. Attainment of student literacy skills in the category of failure is in a large number. Thus, the literacy ability of second grade students of Junior High School, in South Sulawesi is in the failed category.

**Table 3.** Frequency and Percentage of Indicator Attainment of Chemistry Literacy Ability

No.	Indikator	SMP 6 Makassar		SMP 26 Makassar		SMP 2 Maros		SMP 4 Sinjai	
		f	%	f	%	f	%	F	%
1	Identify valid scientific opinions	9	14,5	29	54,7	12	20	28	47,4
2	Search effectively for literatures	1	0,16	10	18,8	16	26,6	6	10,1
3	Evaluate using and misusing of scientific information	25	40,3	5	0,9	7	11,6	16	27,1
4	Understand elements of research design	5	0,8	16	30,2	31	51,6	21	35,6
5	Make accurately graph from data	28	45,1	21	39,6	21	35	21	35,6
6	Interpretate accurately from graph	5	0,8	8	15,1	9	15	6	10,1
7	Solve problem with quantitative and qualitative skill	30	48,4	6	11,3	19	31,6	28	47,4

8	Understand and implement basic statistics	1	0,16	11	20,7	10	16,6	8	13,5
9	Make inferences, predictions, and draw conclusions based on quantitative data	35	56,4	10	18,8	8	13,3	26	44
10	Draw conclusions from data of graph	30	48,4	10	18,8	12	20	34	57,6

Table 3 shows that the highest indicator of chemical literacy is in indicators 3, 5, 7, 9 and 10 obtained by students of SMP Negeri 6 Makassar. The highest indicators for numbers 1, 7, 9, and 10 were obtained by students of SMPN 4 Sinjai. The highest indicator of chemical literacy ability in both schools reached 7 indicators. Only indicators number 2, 6 and 8 are still difficult so students are very rarely able to do it. If the percentage of students who reach the highest score is only 27% (63 out of 234 samples), this is classified as very low.

**Table 4.** Analysis of Teacher and Parents Guidance

School Name	Teacher's Guidance/ Category		Parent's Guidance/ Category	
SMP Negeri 6 Makassar	2,29	Low	2,45	Medium
SMP Negeri 26 Makassar	2,1	Low	2,37	Low
SMP Negeri 2 Maros	2,55	High	2,65	High
SMP Negeri 4 Sinjai	2,6	High	2,43	Medium

Table 4 shows that the provision of teachers and parents guidance in order to help students' chemical literacy skills is still in the Medium category. Even though there is one school that gives the High category. This indicates that the involvement of teachers and parents in guiding students to understand chemistry lessons is still very much needed and expected.

**Table 5.** Correlation Between Chemistry Literacy Ability with Parents and Teacher's Guidance

School Name	Correlation Value ( R )	
	Teacher's Guidance/ Category	Parent's Guidance/ Category
SMP Negeri 6 Makassar	0,6	0,45
SMP Negeri 26 Makassar	0,48	0,47
SMP Negeri 2 Maros	0,74	0,45
SMP Negeri 4 Sinjai	0,6	0,31

Mean ( % ) r	0,6	0,42
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This research focuses on the role of teachers and parents in guiding students to study chemical science during in school and home. Components of the role of teachers in schools include guiding homework assignments, giving daily tests and giving project assignments. Teacher guidance is done by giving feedback on the work of students and always provide reinforcement and motivation. The highest literacy ability in the SMP Negeri 6 Makassar and SMP Negeri 4 Sinjai classes, there is a correlation between teacher guidance and literacy skills at the school. Teacher guidance is guidance that helps students in constructing their learning experiences. This is in accordance with (Santrock, 2010) that children will learn better if they construct their knowledge and understanding. At SMP Negeri 2 Maros, the highest correlation between teacher guidance and the literacy ability of the students was seen, but in fact the literacy ability of the students was still in the sufficient category. Thus the correlation is negative. Teacher guidance at schools that do not meet the good literacy ability of their students such as SMPN 26 Makassar and SMPN 2 Maros, may be caused by the teacher guidance representation that is less proportional during assignment, such as student services not according to needs, wrong classification, class placement which is not quite right (11) .But overall teacher guidance falls into the high correlation category (0, 62)

While parents guidacnce at home in the form of accompanying children to learn, help to do homework and provide instructions or advice when viewed from the level of correlation with the literacy ability of students, grouped in the category of sufficient. Although the correlation is sufficient, at this stage, there are still opportunities for parents through cooperation with the teacher so that parents more concern to children's learning at home. The effort that can be done by a school or teacher is to send a notification letter to parents about the actions that will be taken in a technical manner to produce a change in children's learning behavior (11) .

Chemistry literacy is quite needed to improve student science literacy. Science literacy can be interpreted as scientific knowledge and skills to identify questions, obtain new knowledge, explain scientific phenomena, and draw conclusions based on facts, understand the characteristics of science, awareness on how science and technology shape the natural, intellectual, and cultural environments, and the willingness to engage and care about issues related to science (5) . (12) in the Ministry of Education and Culture (2017) stated that the set of scientific competencies needed in scientific literacy, reflects the view that science is the sampel of social and common epistemic practices to all sciences, which frames all competencies as actions.

Atomic, ionic and molecular matter is a science lesson that underlies the understanding of further chemical science lessons. In line with the results of the study (13) which found that Junior High School students in Pekalongan Indonesia liked chemical practicum, but were not interested in theoretical material because chemistry lessons are complex with very abstracts, many symbols must be known , and they have no curiosity. Because chemistry lessons are difficult for students, (14) suggests that one way to reduce the difficulty of learning chemistry is reduce attitude problems and motivate students towards chemistry lessons. (15) stated that the students' strategy in interpreting chemistry is to use relevant contexts, offer material content based on knowledge needs and make students take additional entry.

Teacher's guidance include learning activities in classroom. One very good program for increase this understanding of chemical science literacy is by model learning that directly involve students in finding problems such as guided inquiry learning (16). Furthermore, the PISA (Program for International Student Assessment) trains students' ability to use scientific knowledge, identifies problems related to nature and draws conclusions based on evidence in order to understand and make decisions about natural phenomena and changes that occur in nature as a result of human activity (17). In addition, they establishes five components of the scientific process in the assessment of scientific literacy, namely: 1) recognizing scientific questions relating to two or more variables so that it can be

investigated scientifically, 2) identifying evidence of scientific inquiry, namely the process of identifying evidence, procedures, tools and materials designed to carry out scientific processes, 3) drawing conclusions based on evidence gathered and underlying theories, 4) communicating conclusions in oral and written language, 5) demonstrating understanding of scientific concepts, in different situations from what they have learned.

The formal education system which provide solutions to increase the ability of scientific literacy through learning in schools, and guidance by teachers has been done in various ways and strategies. Those system have been considered as insufficient way. The supporting system from both parents make it possible to help students understand chemical literacy, as Vygotsky stated in (18) that children will be more developed and able to enhance their formal thinking with others. In this case, teachers and parents have an important role due to the longer emotional closeness. Especially parents already know the character of their own children so it is easier to direct their children in learning.

Chemical literacy abilities that need to be develop in Junior High School students can be classified in two broad categories. The categories are namely first; understanding the scientific method through identifying problems, conducting searches, evaluating learning outcomes and understanding the elements of the scientific method. Second, students are able to organize, analyze, interpret both quantitative and qualitative data among others, making graphs, reading them correctly, interpreting, solving problems, interpreting based on data and drawing conclusions. Both types of literacy skills are still difficult for students to apply because they are not accustomed to meaningful learning through active learning, familiarizing those who find problems to solve and draw conclusions. This statement is in line with the results of (19) which showed that the science literacy ability of students is dominantly appear in the nominal category with a percentage range of 54% - 95%, and small portion appear in the functional category with a percentage range of 4% - 9%. The conceptual and multidimensional categories are at the percentage of 0%. These results are in accordance with reports from the results of the 2003, 2006, 2009 and 2012 PISA studies which showed the ability of scientific literacy from Indonesia is in the low category.

#### **4. CONCLUSION**

The results of this study found that the literacy ability of second grade student of Junior High School in South Sulawesi was still in the sufficient category. The correlation between teacher guidance in schools with the overall literacy ability of students is 0.62 which is included in the high category. While the correlation between parental guidance and literacy ability of students is 0.42, which is included in the sufficient category. In other words the guidance of both parties from teachers and parents of students still needs to be improved by encouraging a variety of ways, especially in paying attention to the shortcomings and needs of students in understanding lessons such as learning models that lead students to construct knowledge and understanding, feedback on test results and home assignments, parents more time to guide their children at home and give attention or motivation to study harder.

## **References**

1. Dian, F., Hairida. RR. Self-Efficacy Guru Dan Hubungannya Dengan Hasil Belajar Kimia Kelas X SMA Se-Kecamatan Sungai Ambawang. 2015.
2. Darmawan IG JA. Pengaruh Motivasi Belajar Terhadap Hasil Belajar Siswa Kelas XI Pada Mata Pelajaran Menggambar Bangunan SMK Negeri 1 Seyegan. E-Journal Pend Tek Sipil Dan Perenc. 2016;4 (1).
3. Drucker MJ. What Reading Teachers Should Know About ESL Learners: Good Teaching Is Teaching For All. These Strategies Will Help English-Language Learners, But They Will Help Typical Learners As Well. 2003. 22-30. p.
4. Chohan BI. Impact of Parental Support on the Academic Performance and Self Concept of the Student. Government College for Woman Zafar-ul-haq Road Rawalpindi Education; 2010.
5. OECD. Program For International Student Assessment (PISA) Result PISA 2015. In: Oecd. 2016. p. 1–8.
6. Mulyani S. Tertinggalnya Pendidikan Harus Jadi Cermin. In: Pertemuan Tahunan IMF-Bank Dunia. Washington DC: Media Indonesia Jakarta; 2017.
7. Kusuma D. Tertinggalnya Pendidikan Harus Jadi Cermin. In: Pertemuan Tahunan IMF-Bank Dunia. Washington DC: Media Indonesia Jakarta; 2017.
8. Hardinata A PR. Implementation of Scientific Literacy Competencies PISA Framework 2015 Through Lesson Study: Teacher Knowledge and Result Discussion. J Phys Conf Ser. 2019;1317 (1):012211.
9. Ip WY, Lee DT, Lee IF, Chau JP, Wootton YS CA. Disposition Towards Critical Thinking: A Study of Chinese Undergraduate Nursing Students. J Adv Nurs. 2000;32 (1):84–90.
10. JG. M. Student Attitudes Towards Chemistry: An Examination of Choices and Preferences. Am J Educ Res. 2014;2 (6):351–6.
11. Halonen JS SJ. Your Guide To College Success: Strategies for Achieving Your Goals. Cengage Learning; 2012.
12. National Research Council. Science Literacy: Concepts, Contexts, and Consequences. Washington: National Academy of Sciences; 2016.
13. Sausan, I., Saputro, S., Indriyanti, Y. N. Chemistry for Beginners: What Makes Good and Bad Impression. In: MISEI Conference Advances In Intellegent Systems Research (AISR). 2018. p. Volume 157.
14. Sirhan G. Learning Difficulties in Chemistry: An Overview. Jerusalem, Palestine: Department of Education and Psychology, Al-Quds University; 2006.
15. Westbroek,, H., Klaassen, K., Bulte, A. PA. Characteristics of Meaningful Chemistry Education. Res Qual Sci Educ. 2006;67–76.
16. Imansari, M., Sudarmin., Sumarni W. Analisis Literasi Kimia Melalui Pembelajaran Inquiry Terbimbing bermuatan Etnosains. J Inov Pendidik Kim. 2018;Volume 12:2201–11.
17. Willms JD. Student Engagement at School: A Sense of Belonging and Participation: Results from PISA 2000. 2003.
18. Ayuningsih D. Psikologi Perkembangan Anak. Yogyakarta: Pustaka Larasati; 2009.
19. Odja. P. Analisis Kemampuan Awal Literasi Sains Siswa Pada Konsep IPA. In: Prosiding Seminar Nasional Kimia [Internet]. Surabaya: Jurusan Kimia FMIPA Universitas Negeri Surabaya; 2014. Available from: <https://link.springer.com/book/10.1007/1-4020-3673-6>

# Correlation Between Teacher Guidance and Parent with Chemistry Literation Ability of Student

Comment [1]: Chemical

Comment [2]: Junior High School

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**Abstract.** This research was a quantitative descriptive study that aims to find out the chemical literacy ability, form of teacher and parent guidance, correlation between teacher and parent guidance on literacy chemical of second grade student in Junior High School on atomic, ionic, and molecular topic. The research sample of 234 students was taken by simple random for four schools at South Sulawesi. The design of this study is a survey research with the study population was all second grade student of Junior High School students in South Sulawesi. The ability of chemical literacy tested consists of the ability to understand the question methods that lead to scientific knowledge and the ability to organize, analyze and interpret quantitative data and scientific information with a total of 10 indicators. The instruments used included a questionnaire, and multiple choice test forms of 10 items that had been tested for validity and reliability. The provision of questionnaires aims to determine the role of teachers in the learning process at school and the role of parents in guiding students at home. The test is used to determine the literacy ability of students. Data were analyzed using quantitative descriptive statistics. The results of the data analysis found that average of the chemical literacy ability of Junior High School students in South Sulawesi is in the enough category. The mean of correlation between teacher guidance with students were high category, and the mean of correlation between parental guidance with students were enough category.

Comment [3]: Give 1-2 sentence (s) as an introduction

**Keywords:** literacy chemistry, teacher, parent, guidance, correlation, students junior high school

## 1. INTRODUCTION

Indonesian students have participated in the international level to compete for quality of Indonesia in education field. Even though students from Indonesia were still in the low ranks of the PISA and TIMSS studies, but have tried their best so that the results of the Ministry of Education and Development Assessment and Education Center (Balitbang) Head of Education (2018) have recently stated obviously that sampling level of Indonesian students already increased in the PISA Test, starting in 2003, the achievement of students was only 46%, in 2006 it reached 53%, in 2012 increased to 63.4% and in 2015 it increased again to 68.2%. The PISA Exam System, it is directly determined by the OECD. This test is assessed on three competencies, namely reading, mathematics and science. Science competency achieved the biggest result according to data from 2012-2015

obtained from 382 points up to 403 points (position rises 6 ranks). However, the achievement of scientific literacy is still quite far from developed countries.

One of the many factors causing the ability of Indonesian scientific literacy is still low, is the teacher's guidance during the learning process. Those aspects consists of classroom management, direct involvement of students, learning models and methods using, conformity with the characteristics of teaching materials, discipline, and direct individual guidance. Teacher and parent guidance is needed and this support is very beneficial for students, especially in the form of teacher guidance that reaches out to all students in the classroom. It also include parents support in the form of intensive guidance to their children at home such as helping with assignment or homework and helping to solve problems faced by students. Effective teachers teach well as what the study results of (1) found a positive correlation between teacher efficacy and learning outcomes with sufficient categories (56.27%). Teachers who gave efficacy support to students also contribute a positive correlation  $r_{xy} = 0.414$  and  $p = 0.000$ , high teacher guidance made students' affective and efficacy contributions with total (17.2%). Similar to the findings of (2) that during learning process, teachers need to implement various types of motivation so that students can achieve good learning outcomes. According to him, different motivations affect learning outcomes to be good results. More emphasized by (3) which stated that the most influencing that dominantly affect learner's success is the teacher. They reported that a good, fair, flexible behavior of teachers, have interesting strategies for each learning and clear list of activities.

The guidance factor of parents (father and mother) to guide students at home in completing homework or when studying is one of the factors that needs serious attention and is carried out routinely with high quality time. (4) through his research found that parental support for academic achievement and self-concept for students has a positive effect. Through the support of teachers and parents in learning allows students to be able to improve the ability of chemical literacy. So far, students who take part in scientific literacy are still very few in numbers. This situation can affect globally the number of students and the achievement of PISA literacy for Indonesia which is still ranked sixth to eighth below (5). However, comparing the conditions of Indonesian scientific literacy with other countries that are members of the Organization for Economic Cooperation and Development (OECD) is considered inappropriate by (6). Countries with comparative results under the OECD's average, do not mean the quality of education is poor, "said education observer (7).

The survey result of several Junior High Schools in South Sulawesi, March 2019, showed there were difficulties in Junior High School students in terms of understanding scientific literacy at various levels and components. For example in atomic, ionic and molecular matter, the ability of students to communicate definitions or meanings with their own sentences is very difficult. Likewise in interpreting images and graphics that require association of concepts with understanding in drawing conclusions, it is very difficult. This is inherently with the results of the study (Ahmadi et.al, 2018) which stated that the difficulty of scientific literacy of students is nominal, conceptual and dimensional literacy for lower strata students, whereas students at upper strata, have difficulty in functional literacy (limited to concept understanding). Other research results on the implementation of the 2015 PISA framework literacy competency through lesson study (8).

The research's results on the literacy ability of chemical science on atomic, ionic and molecular materials also need to be revealed because this material is one of basics material that is sufficient to help students understand chemistry lessons at the next level. Chemical material is filled with symbolic letters that have special rules in reading it and need guidance to understand it. Understanding process requires guidance from teachers and parents effectively and continuously both at school and at home. Those guidance will make students become more interested in learning chemistry because they understand it well. (9) stated that chemistry lessons are indeed very difficult, but students who learn before learning begins at school apparently have an understanding of the chemistry concepts and core chemistry material. (10) found that the behavior of students towards chemistry is very good. One of them is due to significant supporting factors at home and teachers in learning chemistry.

Based on several references of research results above, that is the fact that the guidance of teachers and parents in learning chemistry can have a good impact on the ability of scientific literacy for students. This research try to raise a similar problem but in different topic namely atomic, ionic and molecular chemistry as the topic of basic material for chemical studies. More clearly this study is organized under the heading "Chemical literacy ability of Junior High School Students on atomic, ionic and molecular matter". Furthermore, the problem formulation is; 1) how is the intensity of teacher and parent guidance towards students on learning of atomic, ionic and molecular chemistry, 2) is there a correlation between teacher guidance and the literacy ability of Junior High School students in South Sulawesi, 3) is there a correlation between parent guidance with literacy skills of Junior High School students in South Sulawesi.

## 2. METHODS

This research design was a quantitative descriptive by describing teacher's guidance at school and guidance of parents at home in terms of helping their learning and task as an effort to clearly understand chemistry literacy. This research was conducted in June 2019 towards four cities and regencies with a total of four schools and seven classes as samples, namely Makassar City, Maros Regency, and Sinjai Regency. The population were all students in the second grade of SMP Negeri in South Sulawesi.

This research was preceded by observing. Next prepare the data collection instrument in the form of interviews, students and teacher's questionnaires, and test sheets with atomic, ionic and molecular matter in the form of 10 multiple choices. The data obtained were analyzed descriptively for data on the type of teacher and parent guidance presented in a tabular form. Data for literacy ability includes the number of samples, the highest and lowest chemical literacy ability values, then analyzed quantitatively knowing the correlation between teacher guidance and parents using the Spearman Rank correlation formula.

Data in this study were collected through open interview techniques, questionnaires and multiple choice tests. Interviews were conducted to all science teachers in four schools of 22 teachers to gather information related to the ability of chemical literacy in atomic, ionic, and molecular materials. The questionnaire was distributed to 234 students to capture data on parental guidance at home. The form of parental guidance analyzed is guidance in doing homework, accompanying children while studying, and giving advice to study more diligently. The questionnaire for teachers solicits data about teacher guidance in the classroom which includes guidance in the form of homework feedback, daily exams feedback, and project feedback. The multiple choice test instrument consists of 10 items containing atomic, ionic and molecular matter. After obtaining student's score, the scores are grouped according to the criteria of learning outcome by Arikunto (2007): 80-100 (very good), 66-79 (good), 56-65 (enough), 40-55 (poor), < 39 (failed). While the value of Spearman Rank correlation according to (Guilford, 1956) : 0,8 -1 (very high), 0,6 – 0,8 (high), 0,4 - 0,6 (enough), 0,2 – 0,4 (low), 0 – 0,2 (very low).

**Comment [4]:** Make it more detailed. How many school.  
how about the sampling technique?

## 3. RESULTS AND DISCUSSIONS

This finding presented the results of descriptive and quantitative analysis of chemical literacy ability, the category of indicators attainment of chemical literacy ability, the results of analysis towards teacher guidance at school and the guidance of parents at home. Finally, the results of the correlation analysis between teacher and parent guidance with the ability of chemical literacy in each school's students.

**Table 1.** Descriptive Statistics of Student Ability of Chemistry Literacy

Descriptive Statistics	SMP 6 MAKASSAR	SMP 26 MAKASSAR	SMP 2 MAROS	SMP 4 SINJAI
Total sampel ( <i>n</i> )	62	53	60	59
Maximum score	60	40	50	70
Minimum score	0	0	0	10
Mean	26,48	23,6	23,95	32,7
Deviation standard	7,13	10,89	15,43	11,1

Based on Table 1, it can be seen that the highest value is 70, the lowest value is 0, with standard deviations varying from SD = 7.13 to SD = 15.43. The highest mean literacy ability is SMP 4 Sinjai district. The lowest grade point average occurs in five classes spread over three schools.

Continues with categorizing the achievement of literacy ability, intended to determine the distribution of literacy ability categories of students in the number and percentage of achievement. This information can be seen in Table 2.

**Table 2.** Student Category of Student Ability of Chemistry Literacy

Interval	Category	Junior High School				Student Amount	Percentage %
		6 Mks	26 Mks	2 Maros	4 Sinjai		
80-100	Very Good	0	0	0	0	0	0,00
66-79	Good	0	0	0	1	1	0,43
56-65	Enough	5	0	0	2	7	2,99
40-55	Poor	25	9	18	18	70	29,91
<40	Failed	32	44	42	38	156	66,67
Total		31	53	60	59	234	

Based on the data in Table 2, only one student attained the good category, namely students from SMPN 4 Sinjai. Attainment of student literacy skills in the category of failure is in a large number. Thus, the iteration ability of second grade students of Junior High School, in South Sulawesi is in the failed category.

**Table 3.** Frequency and Percentage of Indicator Attainment of Chemistry Literacy Ability

No.	Indikator	SMP 6 Makassar		SMP 26 Makassar		SMP 2 Maros		SMP 4 Sinjai	
		f	%	f	%	f	%	F	%
1	Identify valid scientific opinions	9	14,5	29	54,7	12	20	28	47,4
2	Search effectively for literatures	1	0,16	10	18,8	16	26,6	6	10,1
3	Evaluate using and misusing of scientific information	25	40,3	5	0,9	7	11,6	16	27,1
4	Understand elements of research design	5	0,8	16	30,2	31	51,6	21	35,6
5	Make accurately graph from data	28	45,1	21	39,6	21	35	21	35,6
6	Interpretate accurately from graph	5	0,8	8	15,1	9	15	6	10,1
7	Solve problem with quantitative and qualitative skill	30	48,4	6	11,3	19	31,6	28	47,4

**Comment [5]:** Researcher can make a graph as a visualization of table

8	Understand and implement basic statistics	1	0,16	11	20,7	10	16,6	8	13,5
9	Make inferences, predictions, and draw conclusions based on quantitative data	35	56,4	10	18,8	8	13,3	26	44
10	Draw conclusions from data of graph	30	48,4	10	18,8	12	20	34	57,6

Table 3 shows that the highest indicator of chemical literacy is in indicators 3, 5, 7, 9 and 10 obtained by students of SMP Negeri 6 Makassar. The highest indicators for numbers 1, 7, 9, and 10 were obtained by students of SMPN 4 Sinjai. The highest indicator of chemical literacy ability in both schools reached 7 indicators. Only indicators number 2, 6 and 8 are still difficult so students are very rarely able to do it. If the percentage of students who reach the highest score is only 27% (63 out of 234 samples), this is classified as very low.

**Table 4.** Analysis of Teacher and Parents Guidance

School Name	Teacher's Guidance/ Category		Parent's Guidance/ Category	
SMP Negeri 6 Makassar	2,29	Low	2,45	Medium
SMP Negeri 26 Makassar	2,1	Low	2,37	Low
SMP Negeri 2 Maros	2,55	High	2,65	High
SMP Negeri 4 Sinjai	2,6	High	2,43	Medium

Table 4 shows that the provision of teachers and parents guidance in order to help students' chemical literacy skills is still in the Medium category. Even though there is one school that gives the High category. This indicates that the involvement of teachers and parents in guiding students to understand chemistry lessons is still very much needed and expected.

**Table 5.** Correlation Between Chemistry Literacy Ability with Parents and Teacher's Guidance

School Name	Correlation Value ( R )	
	Teacher's Guidance/ Category	Parent's Guidance/ Category
SMP Negeri 6 Makassar	0,6	0,45
SMP Negeri 26 Makassar	0,48	0,47
SMP Negeri 2 Maros	0,74	0,45
SMP Negeri 4 Sinjai	0,6	0,31

Mean ( % ) r	0,6	0,42
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**Comment [6]:** Please describe the table 5

This research focuses on the role of teachers and parents in guiding students to study chemical science during in school and home. Components of the role of teachers in schools include guiding homework assignments, giving daily tests and giving project assignments. Teacher guidance is done by giving feedback on the work of students and always provide reinforcement and motivation. The highest literacy ability in the SMP Negeri 6 Makassar and SMP Negeri 4 Sinjai classes, there is a correlation between teacher guidance and literacy skills at the school. Teacher guidance is guidance that helps students in constructing their learning experiences. This is in accordance with (Santrock, 2010) that children will learn better if they construct their knowledge and understanding. At SMP Negeri 2 Maros, the highest correlation between teacher guidance and the literacy ability of the students was seen, but in fact the literacy ability of the students was still in the sufficient category. Thus the correlation is negative. Teacher guidance at schools that do not meet the good literacy ability of their students such as SMPN 26 Makassar and SMPN 2 Maros, may be caused by the teacher guidance representation that is less proportional during assignment, such as student services not according to needs, wrong classification, class placement which is not quite right (11) .But overall teacher guidance falls into the high correlation category (0, 62)

While parents guidance at home in the form of accompanying children to learn, help to do homework and provide instructions or advice when viewed from the level of correlation with the literacy ability of students, grouped in the category of sufficient. Although the correlation is sufficient, at this stage, there are still opportunities for parents through cooperation with the teacher so that parents more concern to children's learning at home. The effort that can be done by a school or teacher is to send a notification letter to parents about the actions that will be taken in a technical manner to produce a change in children's learning behavior (11) .

Chemistry literacy is quite needed to improve student science literacy. Science literacy can be interpreted as scientific knowledge and skills to identify questions, obtain new knowledge, explain scientific phenomena, and draw conclusions based on facts, understand the characteristics of science, awareness on how science and technology shape the natural, intellectual, and cultural environments, and the willingness to engage and care about issues related to science (5) . (12) in the Ministry of Education and Culture (2017) stated that the set of scientific competencies needed in scientific literacy, reflects the view that science is the sample of social and common epistemic practices to all sciences, which frames all competencies as actions.

Atomic, ionic and molecular matter is a science lesson that underlies the understanding of further chemical science lessons. In line with the results of the study (13) which found that Junior High School students in Pekalongan Indonesia liked chemical practical, but were not interested in theoretical material because chemistry lessons are complex with very abstracts, many symbols must be known , and they have no curiosity. Because chemistry lessons are difficult for students, (14) suggests that one way to reduce the difficulty of learning chemistry is reduce attitude problems and motivate students towards chemistry lessons. (15) stated that the students' strategy in interpreting chemistry is to use relevant contexts, offer material content based on knowledge needs and make students take additional entry.

Teacher's guidance include learning activities in classroom. One very good program for increase this understanding of chemical science literacy is by model learning that directly involve students in finding problems such as guided inquiry learning (16). Furthermore, the PISA (Program for International Student Assessment) trains students' ability to use scientific knowledge, identifies problems related to nature and draws conclusions based on evidence in order to understand and make decisions about natural phenomena and changes that occur in nature as a result of human activity (17). In addition, they establishes five components of the scientific process in the assessment of scientific

literacy, namely: 1) recognizing scientific questions relating to two or more variables so that it can be investigated scientifically, 2) identifying evidence of scientific inquiry, namely the process of identifying evidence, procedures, tools and materials designed to carry out scientific processes, 3) drawing conclusions based on evidence gathered and underlying theories, 4) communicating conclusions in oral and written language, 5) demonstrating understanding of scientific concepts, in different situations from what they have learned.

The formal education system which provide solutions to increase the ability of scientific literacy through learning in schools, and guidance by teachers has been done in various ways and strategies. Those system have been considered as insufficient way. The supporting system from both parents make it possible to help students understand chemical literacy, as Vygotsky stated in (18) that children will be more developed and able to enhance their formal thinking with others. In this case, teachers and parents have an important role due to the longer emotional closeness. Especially parents already know the character of their own children so it is easier to direct their children in learning.

Chemical literacy abilities that need to be develop in Junior High School students can be classified in two broad categories. The categories are namely first; understanding the scientific method through identifying problems, conducting searches, evaluating learning outcomes and understanding the elements of the scientific method. Second, students are able to organize, analyze, interpret both quantitative and qualitative data among others, making graphs, reading them correctly, interpreting, solving problems, interpreting based on data and drawing conclusions. Both types of literacy skills are still difficult for students to apply because they are not accustomed to meaningful learning through active learning, familiarizing those who find problems to solve and draw conclusions. This statement is in line with the results of (19) which showed that the science literacy ability of students is dominantly appear in the nominal category with a percentage range of 54% - 95%, and small portion appear in the functional category with a percentage range of 4% - 9%. The conceptual and multidimensional categories are at the percentage of 0%. These results are in accordance with reports from the results of the 2003, 2006, 2009 and 2012 PISA studies which showed the ability of scientific literacy from Indonesia is in the low category.

#### 4. CONCLUSION

The results of this study found that the literacy ability of second grade student of Junior High School in South Sulawesi was still in the sufficient category. The correlation between teacher guidance in schools with the overall literacy ability of students is 0.62 which is included in the high category. While the correlation between parental guidance and literacy ability of students is 0.42, which is included in the sufficient category. In other words the guidance of both parties from teachers and parents of students still needs to be improved by encouraging a variety of ways, especially in paying attention to the shortcomings and needs of students in understanding lessons such as learning models that lead students to construct knowledge and understanding, feedback on test results and home assignments, parents more time to guide their children at home and give attention or motivation to study harder.

How about the acknowledgment?

**Comment [7]:** And suggestion

## References

1. Dian, F., Hairida. RR. Self-Efficacy Guru Dan Hubungannya Dengan Hasil Belajar Kimia Kelas X SMA Se-Kecamatan Sungai Ambawang. 2015.
2. Darmawan IG JA. Pengaruh Motivasi Belajar Terhadap Hasil Belajar Siswa Kelas XI Pada Mata Pelajaran Menggambar Bangunan SMK Negeri 1 Seyegan. E-Journal Pend Tek Sipil Dan Perenc. 2016;4 (1).
3. Drucker MJ. What Reading Teachers Should Know About ESL Learners: Good Teaching Is Teaching For All. These Strategies Will Help English-Language Learners, But They Will Help Typical Learners As Well. 2003. 22-30. p.
4. Chohan BI. Impact of Parental Support on the Academic Performance and Self Concept of the Student. Government College for Woman Zafar-ul-haq Road Rawalpindi Education; 2010.
5. OECD. Program For International Student Assessment (PISA) Result PISA 2015. In: Oecd. 2016. p. 1–8.
6. Mulyani S. Tertinggalnya Pendidikan Harus Jadi Cermin. In: Pertemuan Tahunan IMF-Bank Dunia. Washington DC: Media Indonesia Jakarta; 2017.
7. Kusuma D. Tertinggalnya Pendidikan Harus Jadi Cermin. In: Pertemuan Tahunan IMF-Bank Dunia. Washington DC: Media Indonesia Jakarta; 2017.
8. Hardinata A PR. Implementation of Scientific Literacy Competencies PISA Framework 2015 Through Lesson Study: Teacher Knowledge and Result Discussion. J Phys Conf Ser. 2019;1317 (1):012211.
9. Ip WY, Lee DT, Lee IF, Chau JP, Wootton YS CA. Disposition Towards Critical Thinking: A Study of Chinese Undergraduate Nursing Students. J Adv Nurs. 2000;32 (1):84–90.
10. JG. M. Student Attitudes Towards Chemistry: An Examination of Choices and Preferences. Am J Educ Res. 2014;2 (6):351–6.
11. Halonen JS SJ. Your Guide To College Success: Strategies for Achieving Your Goals. Cengage Learning; 2012.
12. National Research Council. Science Literacy: Concepts, Contexts, and Consequences. Washington: National Academy of Sciences; 2016.
13. Sausan, I., Saputro, S., Indriyanti, Y. N. Chemistry for Beginners: What Makes Good and Bad Impression. In: MISEI Conference Advances In Intellegent Systems Research (AISR). 2018. p. Volume 157.
14. Sirhan G. Learning Difficulties in Chemistry: An Overview. Jerusalem, Palestine: Department of Education and Psychology, Al-Quds University; 2006.
15. Westbroek, H., Klaassen, K., Bulte, A. PA. Characteristics of Meaningful Chemistry Education. Res Qual Sci Educ. 2006;67–76.
16. Imansari, M., Sudarmin., Sumarni W. Analisis Literasi Kimia Melalui Pembelajaran Inquiry Terbimbing bermuatan Etnosains. J Inov Pendidik Kim. 2018;Volume 12:2201–11.
17. Willms JD. Student Engagement at School: A Sense of Belonging and Participation: Results from PISA 2000. 2003.
18. Ayuningsih D. Psikologi Perkembangan Anak. Yogyakarta: Pustaka Larasati; 2009.
19. Odja. P. Analisis Kemampuan Awal Literasi Sains Siswa Pada Konsep IPA. In: Prosiding Seminar Nasional Kimia [Internet]. Surabaya: Jurusan Kimia FMIPA Universitas Negeri Surabaya; 2014. Available from: <https://link.springer.com/book/10.1007/1-4020-3673-6>

# **Correlation Between Teacher Guidance and Parent with Chemical Literation Ability of Junior High School Student**

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**Abstract.** The ability of chemical literacy of Junior High School students need better attention, so that they can easily understand chemistry lessons at the next level. Teachers and parents should be involved in guiding students to learn so that their understanding structures are well organized and clear. This research was a quantitative descriptive study that aims to find out the chemical literacy ability, form of teacher and parent guidance, correlation between teacher and parent guidance on literacy chemical of second grade student in Junior High School on atomic, ionic, and molecular topic. The research sample of 234 students was taken by simple random for four schools at South Sulawesi. The design of this study is a survey research with the study population was all second grade student of Junior High School students in South Sulawesi. The ability of chemical literacy tested consists of the ability to understand the question methods that lead to scientific knowledge and the ability to organize, analyze and interpret quantitative data and scientific information with a total of 10 indicators. The instruments used included a questionnaire, and multiple choice test forms of 10 items that had been tested for validity and reliability. The provision of questionnaires aims to determine the role of teachers in the learning process at school and the role of parents in guiding students at home. The test is used to determine the literacy ability of students. Data were analyzed using quantitative descriptive statistics. The results of the data analysis found that average of the chemical literacy ability of Junior High School students in South Sulawesi is in the enough category. The mean of correlation between teacher guidance with students were high category, and the mean of correlation between parental guidance with students were enough category.

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Indonesian students have participated in the international level to compete for quality of Indonesia in education field. Even though students from Indonesia were still in the low ranks of the PISA and TIMSS studies, but have tried their best so that the results of the Ministry of Education and Development Assessment and Education Center (Balitbang) Head of Education (2018) have recently stated obviously that sampling level of Indonesian students already increased in the PISA Test, starting in 2003, the achievement of students was only 46%, in 2006 it reached 53%, in 2012 increased to 63.4% and in 2015 it increased again to 68.2%. The PISA Exam System, it is directly

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Deviation standard	7,13	10,89	15,43	11,1

Based on Table 1, it can be seen that the highest value is 70, the lowest value is 0, with standard deviations varying from SD = 7.13 to SD = 15.43. The highest mean literacy ability is SMP 4 Sinjai district. The lowest grade point average occurs in five classes spread over three schools.

Continues with categorizing the achievement of literacy ability, intended to determine the distribution of literacy ability categories of students in the number and percentage of achievement. This information can be seen in Table 2.

**Table 2.** Student Category of Student Ability of Chemistry Literacy

Interval	Category	Junior High School				Student Amount	Percentage %
		6 Mks	26 Mks	2 Maros	4 Sinjai		
80-100	Very Good	0	0	0	0	0	0,00
66-79	Good	0	0	0	1	1	0,43
56-65	Enough	5	0	0	2	7	2,99
40-55	Poor	25	9	18	18	70	29,91
<40	Failed	32	44	42	38	156	66,67
Total		31	53	60	59	234	

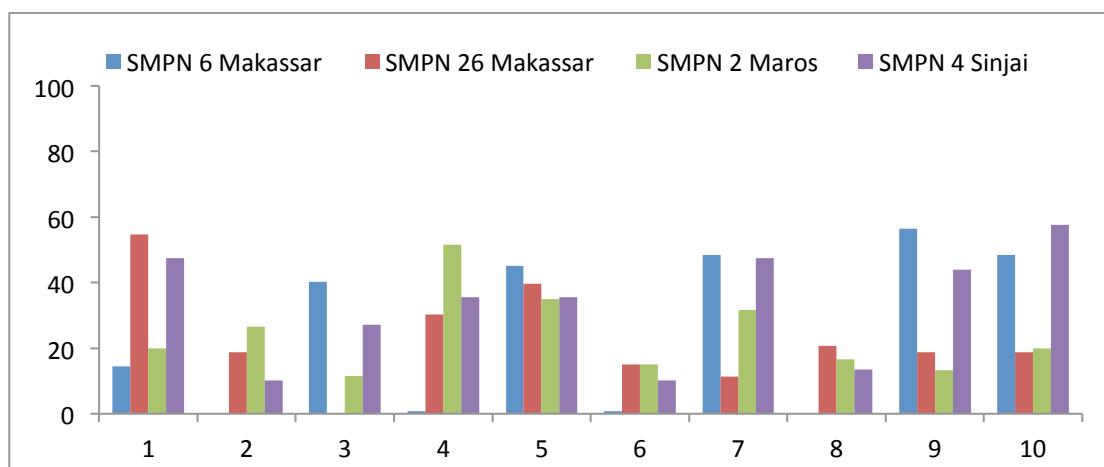
Based on the data in Table 2, only one student attained the good category, namely students from SMPN 4 Sinjai. Attainment of student literacy skills in the category of failure is in a large number. Thus, the literacy ability of second grade students of Junior High School, in South Sulawesi is in the failed category.

**Table 3.** Frequency and Percentage of Indicator Attainment of Chemistry Literacy Ability

No.	Indikator	SMP 6 Makassar		SMP 26 Makassar		SMP 2 Maros		SMP 4 Sinjai	
		f	%	f	%	f	%	F	%
1	Identify valid scientific opinions	9	14,5	29	54,7	12	20	28	47,4
2	Search effectively for literatures	1	0,16	10	18,8	16	26,6	6	10,1
3	Evaluate using and misusing of scientific information	25	40,3	5	0,9	7	11,6	16	27,1
4	Understand elements of research design	5	0,8	16	30,2	31	51,6	21	35,6
5	Make accurately graph from data	28	45,1	21	39,6	21	35	21	35,6

6	Interpretate accurately from graph	5	0,8	8	15,1	9	15	6	10,1
7	Solve problem with quantitative and qualitative skill	30	48,4	6	11,3	19	31,6	28	47,4
8	Understand and implement basic statistics	1	0,16	11	20,7	10	16,6	8	13,5
9	Make inferences, predictions, and draw conclusions based on quantitative data	35	56,4	10	18,8	8	13,3	26	44
10	Draw conclusions from data of graph	30	48,4	10	18,8	12	20	34	57,6

Table 3 shows that the highest indicator of chemical literacy is in indicators 3, 5, 7, 9 and 10 obtained by students of SMP Negeri 6 Makassar. The highest indicators for numbers 1, 7, 9, and 10 were obtained by students of SMPN 4 Sinjai. The highest indicator of chemical literacy ability in both schools reached 7 indicators. Only indicators number 2, 6 and 8 are still difficult so students are very rarely able to do it. If the percentage of students who reach the highest score is only 27% (63 out of 234 samples), this is classified as very low.



**Figure 1.** Graph of percentage of Indicator Attainment of Chemistry Literacy Ability From Four School in South Sulawesi

From figure 1, it can be seen that for the school's chemical literacy ability, only SMP Negeri 6 Makassar can obtain better achievements, these achievements are successive; starting at the highest indicator on item indicator number 9 about making inference prediction and drawing conclusions based on data, item item number 7 about solving problems quantitatively, indicator item item number 10 about drawing conclusions on data from the graph, indicator item item number 5 about making graphs of data precisely and indicator item item number 3, about evaluating the use and misuse of scientific information. If you look at the indicator of item problems that have increased this is associated with the character of scientific literacy questions and the level of cognitive abilities of students, then it can be said that their literacy abilities are good enough and their abilities are at the cognitive level of evaluation and synthesis. SMPN 4 Sinjai also showed quite good grades in several indicators compared to the other two schools. The other two schools, namely SMPN 26 Makassar and SMPN 2 Maros, show slightly lower scores on several indicators compared to SMPN 6 Makassar and SMPN 4 Sinjai

**Table 4.** Analysis of Teacher and Parents Guidance

School Name	Teacher's Guidance/ Category	Parent's Guidance/ Category		
SMP Negeri 6 Makassar	2,29	Low	2,45	Medium
SMP Negeri 26 Makassar	2,1	Low	2,37	Low
SMP Negeri 2 Maros	2,55	High	2,65	High
SMP Negeri 4 Sinjai	2,6	High	2,43	Medium

Table 4 shows that the provision of teachers and parents guidance in order to help students' chemical literacy skills is still in the Medium category. Even though there is one school that gives the High category. This indicates that the involvement of teachers and parents in guiding students to understand chemistry lessons is still very much needed and expected.

**Table 5.** Correlation Between Chemistry Literacy Ability with Parents and Teacher's Guidance

School Name	Correlation Value ( R )	
	Teacher's Guidance/ Category	Parent's Guidance/ Category
SMP Negeri 6 Makassar	0,6	0,45
SMP Negeri 26 Makassar	0,48	0,47
SMP Negeri 2 Maros	0,74	0,45
SMP Negeri 4 Sinjai	0,6	0,31
Mean ( % ) r	0,6	0,42

Table 5, meanly, it is seen that the correlation between teacher guidance in schools with the overall literacy ability of students is 0.60, which is included in the High category. Mediate the correlation between parental guidance with the ability of student's literacy by 0.42 which belongs to the sufficient category. Generally, the two levels of the category can be said to be still in a reasonable stage. More intensive guidance by both parties needs to be increased.

This research focuses on the role of teachers and parents in guiding students to study chemical science during in school and home. Components of the role of teachers in schools include guiding homework assignments, giving daily tests and giving project assignments. Teacher guidance is done by giving feedback on the work of students and always provide reinforcement and motivation. The highest literacy ability in the SMP Negeri 6 Makassar and SMP Negeri 4 Sinjai classes, there is a correlation between teacher guidance and literacy skills at the school. Teacher guidance is guidance that helps students in constructing their learning experiences. This is in accordance with (Santrock,

2010) that children will learn better if they construct their knowledge and understanding. At SMP Negeri 2 Maros, the highest correlation between teacher guidance and the literacy ability of the students was seen, but in fact the literacy ability of the students was still in the sufficient category. Thus the correlation is negative. Teacher guidance at schools that do not meet the good literacy ability of their students such as SMPN 26 Makassar and SMPN 2 Maros, may be caused by the teacher guidance representation that is less proportional during assignment, such as student services not according to needs, wrong classification, class placement which is not quite right (11) .But overall teacher guidance falls into the high correlation category (0, 62)

While parents guidance at home in the form of accompanying children to learn, help to do homework and provide instructions or advice when viewed from the level of correlation with the literacy ability of students, grouped in the category of sufficient. Although the correlation is sufficient, at this stage, there are still opportunities for parents through cooperation with the teacher so that parents more concern to children's learning at home. The effort that can be done by a school or teacher is to send a notification letter to parents about the actions that will be taken in a technical manner to produce a change in children's learning behavior (11) .

Chemistry literacy is quite needed to improve student science literacy. Science literacy can be interpreted as scientific knowledge and skills to identify questions, obtain new knowledge, explain scientific phenomena, and draw conclusions based on facts, understand the characteristics of science, awareness on how science and technology shape the natural, intellectual, and cultural environments, and the willingness to engage and care about issues related to science (5) . (12) in the Ministry of Education and Culture (2017) stated that the set of scientific competencies needed in scientific literacy, reflects the view that science is the sample of social and common epistemic practices to all sciences, which frames all competencies as actions.

Atomic, ionic and molecular matter is a science lesson that underlies the understanding of further chemical science lessons. In line with the results of the study (13) which found that Junior High School students in Pekalongan Indonesia liked chemical practicum, but were not interested in theoretical material because chemistry lessons are complex with very abstracts, many symbols must be known , and they have no curiosity. Because chemistry lessons are difficult for students, (14) suggests that one way to reduce the difficulty of learning chemistry is to reduce attitude problems and motivate students towards chemistry lessons. (15) stated that the students' strategy in interpreting chemistry is to use relevant contexts, offer material content based on knowledge needs and make students take additional entry.

Teacher's guidance include learning activities in classroom. One very good program for increase this understanding of chemical science literacy is by model learning that directly involve students in finding problems such as guided inquiry learning (16). Furthermore, the PISA (Program for International Student Assessment) trains students' ability to use scientific knowledge, identifies problems related to nature and draws conclusions based on evidence in order to understand and make decisions about natural phenomena and changes that occur in nature as a result of human activity (17). In addition, they establishes five components of the scientific process in the assessment of scientific literacy, namely: 1) recognizing scientific questions relating to two or more variables so that it can be investigated scientifically, 2) identifying evidence of scientific inquiry, namely the process of identifying evidence, procedures, tools and materials designed to carry out scientific processes, 3) drawing conclusions based on evidence gathered and underlying theories, 4) communicating conclusions in oral and written language, 5) demonstrating understanding of scientific concepts, in different situations from what they have learned.

The formal education system which provide solutions to increase the ability of scientific literacy through learning in schools, and guidance by teachers has been done in various ways and strategies. Those system have been considered as insufficient way. The supporting system from both parents make it possible to help students understand chemical literacy, as Vygotsky stated in (18) that

children will be more developed and able to enhance their formal thinking with others. In this case, teachers and parents have an important role due to the longer emotional closeness. Especially parents already know the character of their own children so it is easier to direct their children in learning.

Chemical literacy abilities that need to be develop in Junior High School students can be classified in two broad categories. The categories are namely first; understanding the scientific method through identifying problems, conducting searches, evaluating learning outcomes and understanding the elements of the scientific method. Second, students are able to organize, analyze, interpret both quantitative and qualitative data among others, making graphs, reading them correctly, interpreting, solving problems, interpreting based on data and drawing conclusions. Both types of literacy skills are still difficult for students to apply because they are not accustomed to meaningful learning through active learning, familiarizing those who find problems to solve and draw conclusions. This statement is in line with the results of (19) which showed that the science literacy ability of students is dominantly appear in the nominal category with a percentage range of 54% - 95%, and small portion appear in the functional category with a percentage range of 4% - 9%. The conceptual and multidimensional categories are at the percentage of 0%. These results are in accordance with reports from the results of the 2003, 2006, 2009 and 2012 PISA studies which showed the ability of scientific literacy from Indonesia is in the low category.

#### **4. CONCLUSION AND SUGGESTION**

The results of this study found that the literacy ability of second grade student of Junior High School in South Sulawesi was still in the sufficient category. The correlation between teacher guidance in schools with the overall literacy ability of students is 0.62 which is included in the high category. While the correlation between parental guidance and literacy ability of students is 0.42, which is included in the sufficient category. In other words the guidance of both parties from teachers and parents of students still needs to be improved by encouraging a variety of ways, especially in paying attention to the shortcomings and needs of students in understanding lessons such as learning models that lead students to construct knowledge and understanding, feedback on test results and home assignments , parents more time to guide their children at home and give attention or motivation to study harder. This research is expected to contribute in order to expect the next researcher related to literacy ability to consider research on the role of the teacher guiding and directing students to learn meaningfully and constructively in school and the role of parents at home in guiding children to learn so that students' knowledge is better again.

#### **5. ACKNOWLEDGEMENT**

The gratitude is conveyed to the Directorate General of High Education who has provided facilities and platform to conduct research. Likewise, thank you to the head of the UNM Research Institute, SMPN 26 Makassar, SMPN 6 Makassar, SMPN 2 Maros, SMPN 4 Sinjai, who are available to kindly accept researchers and facilitate the research process. The last, to all work relatives who helped in the research process.

## **References**

1. Dian, F., Hairida. RR. Self-Efficacy Guru Dan Hubungannya Dengan Hasil Belajar Kimia Kelas X SMA Se-Kecamatan Sungai Ambawang. 2015.
2. Darmawan IG JA. Pengaruh Motivasi Belajar Terhadap Hasil Belajar Siswa Kelas XI Pada Mata Pelajaran Menggambar Bangunan SMK Negeri 1 Seyegan. E-Journal Pend Tek Sipil Dan Perenc. 2016;4 (1).
3. Drucker MJ. What Reading Teachers Should Know About ESL Learners: Good Teaching Is Teaching For All. These Strategies Will Help English-Language Learners, But They Will Help Typical Learners As Well. 2003. 22-30. p.
4. Chohan BI. Impact of Parental Support on the Academic Performance and Self Concept of the Student. Government College for Woman Zafar-ul-haq Road Rawalpindi Education; 2010.
5. OECD. Program For International Student Assessment (PISA) Result PISA 2015. In: Oecd. 2016. p. 1–8.
6. Mulyani S. Tertinggalnya Pendidikan Harus Jadi Cermin. In: Pertemuan Tahunan IMF-Bank Dunia. Washington DC: Media Indonesia Jakarta; 2017.
7. Kusuma D. Tertinggalnya Pendidikan Harus Jadi Cermin. In: Pertemuan Tahunan IMF-Bank Dunia. Washington DC: Media Indonesia Jakarta; 2017.
8. Hardinata A PR. Implementation of Scientific Literacy Competencies PISA Framework 2015 Through Lesson Study: Teacher Knowledge and Result Discussion. J Phys Conf Ser. 2019;1317 (1):012211.
9. Ip WY, Lee DT, Lee IF, Chau JP, Wootton YS CA. Disposition Towards Critical Thinking: A Study of Chinese Undergraduate Nursing Students. J Adv Nurs. 2000;32 (1):84–90.
10. JG. M. Student Attitudes Towards Chemistry: An Examination of Choices and Preferences. Am J Educ Res. 2014;2 (6):351–6.
11. Halonen JS SJ. Your Guide To College Success: Strategies for Achieving Your Goals. Cengage Learning; 2012.
12. National Research Council. Science Literacy: Concepts, Contexts, and Consequences. Washington: National Academy of Sciences; 2016.
13. Sausan, I., Saputro, S., Indriyanti, Y. N. Chemistry for Beginners: What Makes Good and Bad Impression. In: MISEI Conference Advances In Intellegent Systems Research (AISR). 2018. p. Volume 157.
14. Sirhan G. Learning Difficulties in Chemistry: An Overview. Jerusalem, Palestine: Department of Education and Psychology, Al-Quds University; 2006.
15. Westbroek,, H., Klaassen, K., Bulte, A. PA. Characteristics of Meaningful Chemistry Education. Res Qual Sci Educ. 2006;67–76.
16. Imansari, M., Sudarmin., Sumarni W. Analisis Literasi Kimia Melalui Pembelajaran Inquiry Terbimbing bermuatan Etnosains. J Inov Pendidik Kim. 2018;Volume 12:2201–11.
17. Willms JD. Student Engagement at School: A Sense of Belonging and Participation: Results from PISA 2000. 2003.
18. Ayuningsih D. Psikologi Perkembangan Anak. Yogyakarta: Pustaka Larasati; 2009.
19. Odja. P. Analisis Kemampuan Awal Literasi Sains Siswa Pada Konsep IPA. In: Prosiding Seminar Nasional Kimia [Internet]. Surabaya: Jurusan Kimia FMIPA Universitas Negeri Surabaya; 2014. Available from: <https://link.springer.com/book/10.1007/1-4020-3673-6>