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Factors Affecting Junior High School Students' Scientific Literacy: An Empirical Study

Ade Mayasari[1*], Usmeldi[2]

[1] Magister of Physics Education, Faculty of Mathematic and Natural Science, Universitas Negeri Padang, Padang, Indonesia.
[2] Faculty of Engineering, Universitas Negeri Padang, Padang, Indonesia.

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Corresponding Author:
Ade Mayasari
adepfr09@gmail.com

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Abstract: This research goals to find out the effect of factors that affecting Junior High School scientific literacy such as reading habit, learning motivation, learning achievement, parental attention and creativity, and the effect between each variable. This empirical study used the PLS-SEM in data analysis with SmartPLS 3.0 version app. The number of study samples was 270 students. The samples were taken by probability sampling technique with stratified random sampling type by school accreditation. Questionnaire and test techniques were employed in data collection. The output revealed that there were significant effect of reading habit and creativity on scientific literacy, with a t-value ≥ t-statistic of 1.96. There was no significant effect of learning motivation, learning achievement and parental attention on scientific literacy, with a t-value ≤ t-statistic of 1.96. In addition, there were significant effect of reading habit on learning motivation and creativity, parental attention to reading habit, learning motivation and learning achievement, and learning motivation to learning achievement and creativity.

Keywords: Junior high school; PLS-SEM; Scientific literacy

Introduction

Scientific literacy is a person's ability to apply his knowledge to identify questions, construct new knowledge, provide scientific explanations, draw conclusions based on scientific evidence and the ability to develop a reflective mindset so that he is able to participate in overcoming issues and ideas related to science. Literacy ability is very important for various human activities, including following instructions in a manual, to find out various information about the occurrence of an event, to communicate with other people for certain purposes or transactions (Bybee et al., 2009; Nur'aini et al., 2021; OECD, 2013; Mulyana et al., 2023). The 2018 PISA (Program for International Student Assessment) scores for Indonesia in the areas of literacy, mathematics and science show that students' scientific literacy in Indonesia is still relatively low. Based on scientific literacy data, it is stated that students' ranking in 2018 was ranked 70 out of 78 countries surveyed with a score of 396 (Fuadi et al., 2020). In addition to measurements made by PISA, measurements of scientific literacy were also carried out by the Trend In International Mathematics and Science Study (TIMSS). The results of measurements carried out by TIMSS during Indonesia's participation as an object of this research showed that Indonesia in 2011 when compared to 2015 was still in the low category (Suparya et al., 2021).

Based on data from PISA and TIMSS, it can be seen that students' scientific literacy abilities in Indonesia are still relatively low. The low scores of Pisa and TIMSS Indonesia show that students' abilities are still weak in 3 categories, namely linguistic literacy, scientific literacy, and mathematical literacy (Amanda et al., 2023). Teachers play an important role in developing scientific literacy skills because they can increase knowledge in science investigations, increase oral and written vocabulary in understanding and communicating knowledge, besides that they can also improve the relationship between science, technology and society (Pertiwi et. al., 2018) . Learning preparation makes students be able to literate in science (increase their scientific literacy), have good competence, logical, creative, and able to think critically and collaborate (Anshar et al., 2023). The low PISA and TIMSS scores

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indicate that there is something that needs to be improved in the learning process and in measuring exam results at school (Suparya et al., 2021; Jufri et al., 2019).

Various factors influence students' scientific literacy abilities, namely internal factors and external factors. The external factors can be in the form of the availability of parental attention, teaching materials, the professional ability of teachers who teach, as well as school facilities and infrastructure that support optimal learning in schools. While factors from within students include reading habits, learning motivation, creativity and student achievement. Parental attention is important in supporting children's growth and development, especially in children's education (Susiani et al., 2022). The duties and responsibilities of parents towards children's education are more in the form of character formation, character, skills training and social education. Parents also play a role in preparing children to achieve their future, and this is also manifested in the provision of learning facilities and infrastructure so that students are motivated in carrying out learning tasks and obligations as well as the skills and talents that children will develop (Susanti, 2020).

The purpose of this empirical study is to find out how reading habit, learning motivation, learning achievement, parental attention and creativity effected and later can be used to increase students' scientific literacy. The theoretical model for determining constructs that influence scientific literacy is the Partial Least Square- Structural Equation Model (PLS-SEM). In this model there are 15 hypotheses proposed:

Hypothesis 1 (H1): Reading habits have a significant effect on students' scientific literacy
Hypothesis 2 (H2): Learning motivation has a significant effect on students' scientific literacy
Hypothesis 3 (H3): Learning achievement has a significant effect on students' scientific literacy
Hypothesis 4 (H4): Parents' attention has a significant effect on students' scientific literacy
Hypothesis 5 (H5): Creativity has a significant effect on students' scientific literacy
Hypothesis 6 (H6): Reading habits have a significant effect on students' learning motivation
Hypothesis 7 (H7): Reading habits have a significant effect on student achievement
Hypothesis 8 (H8): Parents' attention has a significant effect on students' reading habits
Hypothesis 9 (H9): Reading habits have a significant effect on students' creativity
Hypothesis 10 (H10): Learning motivation has a significant effect on student achievement
Hypothesis 11 (H11): Parents' attention has a significant effect on students' learning motivation
Hypothesis 12 (H12): Learning motivation has a significant effect on student creativity
Hypothesis 13 (H13): Parents' attention has a significant effect on student achievement
Hypothesis 14 (H14): Creativity has a significant effect on student achievement
Hypothesis 15 (H15): Parent' attention has a significant effect on student creativity

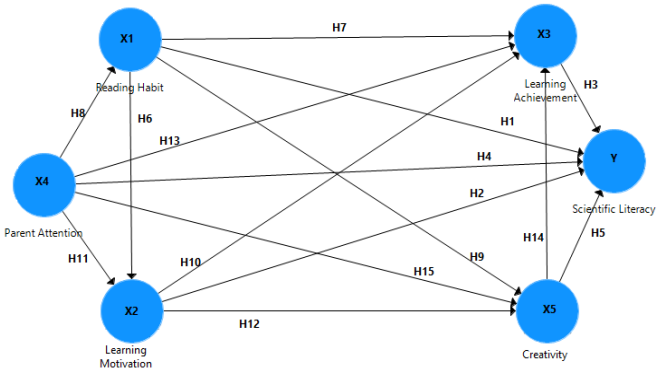

Figure 1. The proposed theoretical model

The results of this study can be used for further research to determine other variables that affect student scientific literacy skills.

Method

This type of research is an empirical study which looks for the relationship of several variables to scientific literacy through questionnaire surveys and tests. This research aims to explain the influence of 5 exogenous variables namely reading habit, learning motivation, learning achievement, parental attention and creativity on scientific literacy. The research was conducted at various state junior high schools in the city of Padang. The sample selection used stratified random sampling, which is based on school accreditation. State Middle Schools in the city of Padang and had three levels of accreditation, namely A, B and C. Therefore, one sample of each school was taken. have different accreditations randomly. The selected schools were SMPN 12 Padang (accreditation A), SMPN 40 Padang (accreditation B) and SMPN 39 Padang (accreditation C). The characteristic of respondent can be seen in Table 1.

Based on Table 1, it can be seen that the respondent data consists of 155 women (57.59%) and 115 men (42.41%). It can also be seen that the majority of the respondents consisted of SMPN 12 Padang with 122 respondents (45.19%), SMPN 40 Padang with 77 respondents (28.52%) and SMPN 39 Padang with 71 respondents (26.30%). Data are processed using

SmartPLS SEM because the sample size is relatively small, or ten times as many indicators used. In this study, data was also taken from 189 respondents (70.5%) of students living with their parents and 81 respondents (29.5%) of students living with guardians. Data was design in February 2023 and collected from May to July 2023. To understand this research, you can see the research flow in Figure 2.

Tabel 1. Respondent Characteristics

Respondent Characteristics		Frequency	Percentage
Gender	Female	155	57.59%
	Male	115	42.41%
	Total	270	100%
School	SMPN 12 Padang	122	45.19%
	SMPN 40 Padang	77	28.52%
	SMPN 39 Padang	71	26.30%
	Total	270	100%
Live with whom	Live with parents	189	70.5%
	Live with a guardian	81	29.5%
Total		270	100%

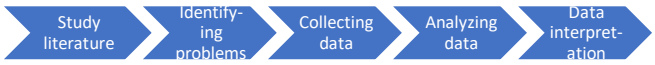

Figure 2. Research flow

How to investigate the proposed hypothesis in a theoretical model, partial least squares structural equations have been used. The most significant impact on students' scientific literacy will come from the results of PLS-SEM, which made predictions about construction. The PLS-SEM consists of two parts that can be seen in Table 2, which make up the estimation process (Cepeda-Carrion et al., 2019; Hair et al., 2019; Hair et al., 2021; Fadhilah et al., 2023). The experimental design can be seen in Table 3.

Table 2. Estimation Process in PLS-SEM

Measurement Model Evaluation	Structural Model Evaluation
Consistency reliability: Cronbach's Alpha (α) and consistency reliability (CR) of 0.7.	R square: model predictions are weak (0.25), moderate (0.5), and strong (0.75).
Convergent Validity: outer loading 0.7 and average variance extracted (AVE) 0.5.	Path coefficient: if p-value < 0.05 the hypothesis is accepted and significant.
Discriminant Validity: Heterotrait-Monotrait Ratio (HTMT) < 0.9.	Q square: has a predictive model relevance if Q square > 0, weak (0), moderate (0.25), and large (0.5).
	Effect size (f2): the effect of exogenous to endogenous constructs if f2 0.02, 0.15, and 0.35 have small, medium, and large effects.

Table 3. Experimental Design (Amna, 2016; Hariati, 2015; Hutomo, 2022; Nasution, 2021; OECD, 2001)

Construct	Item	Indicator
Reading habits	RH1	Intensity
	RH2	Time spent reading
	RH3	Various types of reading
	RH4	Attitude in reading
	RH5	Motivation in reading
	RH6	Techniques in reading
Learning motivation	LM1	Persevere in facing the task
	LM2	Tenacious in the face of difficulty
	LM3	Show interest in various issues
	LM4	Prefer to work independently
	LM5	Get bored quickly with routine
	LM6	tasks
	LM7	Can defend an opinion
Learning achievement	LA	Pleasure to find and solve question Student 2nd Semester Final Exam results
Parents' attention	PA1	Accompany children while studying
	PA2	
	PA3	Give directions, warn and control
	PA4	Provide support to children
	PA5	Give respect to children
	PA6	Be a role model for children
Creativity	C1	Providing fair treatment of both gender Fluently
	C2	Flexibility
	C3	Originality
	C4	Elaboration
Scientific literacy	SL1	Context
	SL2	Content
	SL3	Process

Result and Discussion

All constructs of the developed model meet the criteria of internal consistency, convergent validation (Table 4), and discriminant (Table 5). The final theoretical model is shown in Figure 3.

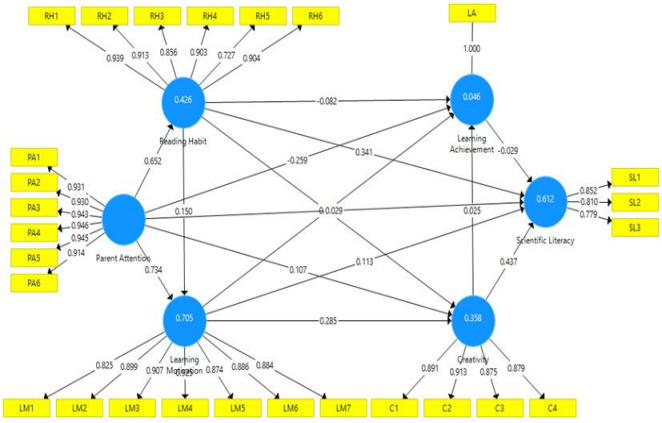

Figure 3. Structural model result

Table 4. Consistency Reliability and Convergent Validity

Construct	Item	Consistency reliability		Convergent validity	
		Cronbach alpha α≤0.7	Composite reliability CR≥ 0.7	Outer loading ≥0.7	AVE≥0.5
Reading Habits	RH1	0.938	0.952	0.939	0.768
	RH2			0.913	
	RH3			0.856	
	RH4			0.903	
	RH5			0.727	
	RH6			0.904	
Learning Motivation	LM1	0.954	0.962	0.825	0.786
	LM2			0.899	
	LM3			0.907	
	LM4			0.925	
	LM5			0.874	
	LM6			0.886	
	LM7			0.884	
Learning Achievement	LA	1.000	1.000	1.000	1.000
Parents' Attention	PA1	0.971	0.976	0.931	0.874
	PA2			0.930	
	PA3			0.943	
	PA4			0.946	
	PA5			0.945	
	PA6			0.914	
Creativity	C1	0.912	0.938	0.891	0.791
	C2			0.913	
	C3			0.875	
	C4			0.879	
Scientific Literacy	SL1	0.745	0.855	0.852	0.663
	SL2			0.810	
	SL3			0.779	

Table 5. Heterotrait-Monotrait Ratio (HTMT)

	Reading habits	Learning motivation	Learning achievement	Parents' attention	Creativity
Reading habits					
Learning motivation	0.661				
Learning achievement	0.014	0.131			
Parents' attention	0.683	0.864	0.031		
Creativity	0.567	0.582	0.059	0.557	
Scientific literacy	0.788	0.696	0.013	0.676	0.838

Table 6. Bootstrapped Results

Path analysis	Path coefficient	T statistic	P-value < 0.05	Hypothesis result
RH→SL	0.341	6.066	0.000	Hypothesis accepted
LM→SL	0.113	1.760	0.079	Hypothesis rejected
LA→SL	-0.029	0.668	0.504	Hypothesis rejected
PA→SL	0.029	0.411	0.681	Hypothesis rejected
C→SL	0.437	8.098	0.000	Hypothesis accepted
RH→LM	0.150	3.785	0.000	Hypothesis accepted
RH→LA	-0.082	0.967	0.334	Hypothesis rejected
PA→RH	0.652	17.962	0.000	Hypothesis accepted
RH→C	0.276	3.440	0.001	Hypothesis accepted
LM→LA	0.383	5.410	0.000	Hypothesis accepted
PA→LM	0.734	20.248	0.000	Hypothesis accepted
LM→C	0.285	4.227	0.000	Hypothesis accepted
PA→LA	-0.259	2.887	0.004	Hypothesis accepted
C→LA	0.025	0.340	0.734	Hypothesis rejected
PA→C	0.107	1.022	0.307	Hypothesis rejected

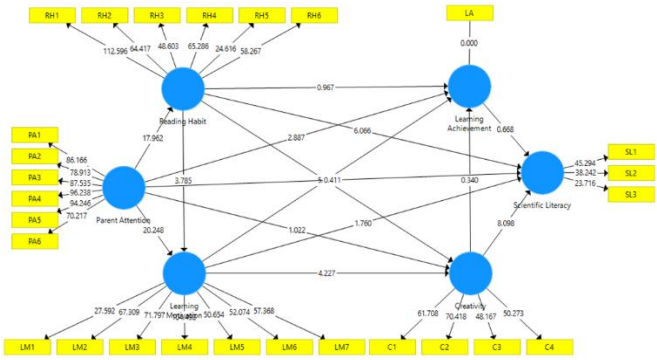

Figure 4. Bootstrapped result

Based on Figure 3 its shows that that all indicators have an α value ≥ 0.7, meaning that the indicators can measure what they want to measure in each variable. Or it could be said that each indicator in the instrument is valid and can be used. There are 4 path coefficient values out of 15 relationships that are negative. The negative sign on the path coefficient value means that the relationship formed is in the opposite direction.

Structural Model Evaluation: Smart PLS-SEM

The results of the path coefficient are shown in Table 6 and Figure 3. It shows that creativity (C) has the most influence on students' scientific literacy. Apart from that, all other exogenous variables also influence students' scientific literacy except learning achievement. Four out of ten relationships between other exogenous variables did not result in any influence between these exogenous variables.

Figure 4 shows that there are 6 relationships that have a p-value > 0.05, meaning that there is no influence between these variables. The predictive power of the model from exogenous to endogenous constructs can be seen in Table 7. It can be seen that the scientific literacy construct can be explained by the variables reading habits, learning motivation, learning achievement, parental attention and creativity of 0.612 or 61.2%, while the remaining 38, 8% is explained by other variables outside the research model. 42.6% of the reading habit construct can be explained by the parental attention variable, while the remaining 57.4% is explained by other variables outside the research model. The construct of learning motivation can be explained by 70.5% by the variables of parental attention and reading habits, while the remaining 29.5% is explained by other variables outside the research model. The construct of learning achievement can be explained by 4.6% by reading habits, learning motivation, parental attention and creativity while the remaining 95.4% is explained by other variables outside the research model. The creativity construct can be explained by 35.8% by the variables of reading habits, learning motivation and parental attention while the remaining 64.2% is explained by other variables outside the research model.

Table 7. R and Q Square

Construct	R^2	Category	Q^2	Category
Reading habits	0.426	Weak	0.323	Moderate
Learning motivation	0.705	Moderate	0.549	Strong
Learning achievement	0.046	Weak	0.014	Weak
Creativity	0.358	Weak	0.279	Moderate
Scientific literacy	0.612	Moderate	0.397	Moderate

The significance of the prediction model (Q^2) for reading habits (0.323) is moderate, learning motivation (0.549) is strong, learning achievement (0.014) is weak, creativity (0.279) is moderate and scientific literacy (0.397) is moderate. It can be concluded that the variables reading habits, learning motivation, learning achievement, creativity and scientific literacy have good observation values because $Q^2 > 0$.

Table 8. F Square

Construct	F Square	Category
RH→SL	0.154	Medium
LM→SL	0.009	Small
LA→SL	0.002	Small
PA→SL	0.001	Small
C→SL	0.316	Medium
RH→LM	0.044	Small
RH→LA	0.004	Small
PA→RH	0.741	Large
RH→C	0.065	Small
LM→LA	0.044	Small
PA→LM	1.049	Large
LM→C	0.037	Small
PA→LA	0.020	Small
C→LA	0.000	Small
PA→C	0.005	Small

The effect size based on table 8 which has the greatest effect is parents' attention to learning motivation and which has the smallest effect is creativity on learning achievement. There are two relationships in large effect, two in medium effect, and eleven in small effect.

The Effect of Reading Habits on Scientific Literacy

Based on Table 6, the parameter coefficient for the influence of the reading habit variable on scientific literacy (original sample) is 0.341, which means there is a positive influence between these two variables. Or it can be interpreted that the higher the students' reading habit, the higher the scientific literacy. Then the resulting T-statistic value is 6.344, which means the result is said to be significant because the t-statistic value is greater than the t-table (6.344 > 1.96) or it can be said that the hypothesis is accepted. This is in line with research

conducted by Nurul Azizah Ayu. The habit of reading in students will be the basis for obtaining, processing, and managing scientific knowledge so that students can use it to develop scientific literacy which is important for life in the future (Ayu et al., 2018; Wahyuni et al., 2018). Scientific literacy is the ability to think scientifically to identify problems and draw conclusions from existing facts in order to understand natural phenomena so that they can make decisions to solve scientific/science problems at hand (Berliana et al., 2023).

The Effect of Learning Motivation on Scientific Literacy

Based on Table 6, the magnitude of the parameter coefficient of the influence of the learning motivation variable on scientific literacy (original sample) is 0.113, which means there is a positive influence between the two variables. Or it can be interpreted that the higher the students' learning motivation, the higher the scientific literacy will be. Then the resulting T-statistic value is 1.912, which means the result is said to be not significant because the t-statistic value is smaller than the t-table (1.912 <1.96) or it can be said that the hypothesis is rejected. This is in line with existing research on motivation learning does not affect scientific literacy abilities (Yanti et al., 2021). Therefore, it is necessary to carry out further research on learning motivation and scientific literacy abilities from various factors because from the results of the research conducted it was found that there is no significant relationship between learning motivation and scientific literacy.

The Effect of Learning Achievement on Scientific Literacy

Based on Table 6, the parameter coefficient for the influence of the learning achievement variable on scientific literacy (original sample) is -0.029, which means there is a negative influence between the two variables. Or it can be interpreted that the lower the learning achievement, the higher the scientific literacy. Then the resulting T-statistic value is 0.666, which means the result is said to be not significant because the t-statistic value is smaller than the t-table (0.666 <1.96) or it can be said that the hypothesis is rejected. This result turns out to be inconsistent with research conducted by Jufrida et al. which stated that there is a significant relationship between scientific literacy and science learning achievement (Jufrida et al., 2019; Armas et al., 2019). Therefore, it is necessary to carry out further research on learning achievement and scientific literacy abilities from various factors because from the results of the research conducted it was found that there is no significant relationship between learning achievement and scientific literacy. Scientific literacy is a requirement that must be possessed by students in solving a challenge that occurs in fast-changing times so that in the learning process scientific literacy is practiced. simultaneously with the development of life skills (Rompegading et al., 2022).

The Effect of Parents' Attention on Scientific Literacy

Based on Table 6, the parameter coefficient for the influence of the parents' attention variable on scientific literacy (original sample) is 0.029, which means there is a positive influence between these two variables. Or it can be interpreted that the higher the parental attention, the better scientific literacy will be. Then the resulting T-statistical value is 0.422, which means the result is said to be not significant because the t-statistical value is smaller than the t-table (0.422 < 1.96) or it can be said that the hypothesis is rejected. This is not in line with existing research that there is a direct influence of parental attention on scientific literacy abilities (Adzkia, 2016). Therefore, it is necessary to carry out further research regarding parental attention and scientific literacy abilities from various factors because the results of the research conducted found that there is no significant relationship between parental attention and scientific literacy.

The Effect of Creativity on Scientific Literacy

Based on Table 6, the parameter coefficient of the influence of the creativity variable on scientific literacy (original sample) is 0.437, which means there is a positive influence between the two variables. Or it can be interpreted that the higher the creativity, the higher the scientific literacy. Then the resulting T-statistic value is 8.343 which means the result is said to be significant because the t-statistic value is greater than t-table (8.343 > 1.96) or it can be said hypothesis accepted. This is in line with research conducted by Azimar Rusdi and M Adzkia. Creativity is one of the internal factors of student learning success. It is very important for an educator to develop student creativity because in everyday life, people with high creativity will also be able to solve problems better (Chalsum et al., 2023). With creative thinking, a person will be able to contribute to developing science and technology and produce varied ideas that are in line with the goals of scientific literacy itself (Rusdi et al., 2017; Adzkia, 2016).

The Effect of Reading Habits on Learning Motivation

Based on Table 6, the magnitude of the parameter coefficient of the influence of the reading habit variable on learning motivation (original sample) is 0.150, which means there is a positive influence between the two variables. Or it can be interpreted that the higher the reading habit, the better the motivation to learn. Then the resulting T-statistic value is 3.670, which means the result is said to be significant because the t-statistic value is greater than the t-table (3.670 > 1.96) or it can be said

that the hypothesis is accepted. This is in line with existing research that reading habits have a correlation with learning motivation and contribute to improving students' writing abilities (Jasni & Atmazaki, 2020).

The Effect of Reading Habits on Learning Achievement

Based on Table 6, the parameter coefficient for the influence of the reading habit variable on learning achievement (original sample) is -0.082, which means there is a negative influence between these two variables. Or it can be interpreted that the lower the reading habit, the higher the motivation to learn. Then the resulting T-statistical value is 0.969, which means the result is said to be not significant because the t-statistical value is smaller than the t-table (0.969 < 1.96) or it can be said that the hypothesis is rejected. This is not in line with existing research that there was a correlation between reading habit and academic achievement and reading habit influenced academic achievement (Erlina et al., 2019). Therefore, it is necessary to carry out further research on reading habits and learning achievement abilities from various factors because from the results of the research conducted it was found that there is no significant relationship between reading habits and learning achievement.

The Effect of Parents' Attention on Reading Habits

Based on Table 6, the parameter coefficient for the influence of the parental attention variable on reading habits (original sample) is 0.652, which means there is a positive influence between these two variables. Or it can be interpreted that the higher the parental attention, the better reading habits will be. Then the resulting T-statistic value is 17.327, which means the result is said to be significant because the t-statistic value is greater than the t-table (17.327 > 1.96) or it can be said that the hypothesis is accepted. Path analysis in other studies shows that half of parental influence on children's reading ability is negligible and the other half is due to children's cognitive foundations. The pair correlation is small but significant (van Bergen et al., 2015).

The Effect of Reading Habits on Creativity

Based on Table 6, the magnitude of the parameter coefficient of the influence of the reading habit variable on creativity (original sample) is 0.276, which means there is a positive influence between the two variables. Or it can be interpreted that the lower the reading habit, the higher the creativity. Then the resulting T-statistic value is 3.513, which means that the result is said to be significant because the t-statistic value is greater than the t-table (3.513 > 1.96) or it can be said that the hypothesis is accepted. This is in line with existing research that habitual reading and writing have a positive relationship with creative thinking, especially the ability of elaboration (Wang, 2012). Thinking skills are closely related to language development, and it is highly possible that creative thinking has a certain connection with reading and writing abilities. Creativity is consistently associated with the abilities that are required for reading and writing. The traits that are encouraged by reading and writing appear to have the same characteristics that creativity researchers suggest foster creativity, such as the freedom and ability to communicate ideas, an emphasis on self-discovery and attention to the individual (Wang, 2012). Creativity is an important aspect of learning and teaching. This ability can be interpreted as the ability to respond and provide a way out of all existing solutions, is involved in the discovery process for problems and the ability to produce or create something new. In everyday life, people with high creativity will also be able to solve problems better (Chalsum et al., 2023).

The Effect of Learning Motivation on Learning Achievement

Based on Table 6, the magnitude of the parameter coefficient of the influence of the learning motivation variable on learning achievement (original sample) is 0.383, which means there is a positive influence between the two variables. Or it can be interpreted that the higher the motivation to learn, the better the learning achievement will be. Then the resulting T-statistic value is 4.815, which means that the result is said to be significant because the t-statistic value is greater than the t-table (4.815 > 1.96) or it can be said that the hypothesis is accepted. This is in line with existing research that there is a positive and significant relationship between learning motivation and learning achievement (Waritsman, 2020). With the high of motivation learning, students will be able to do learning activities and always pay attention to the lesson so that learning achievements will be easy to achieve (Lestari, 2020). Achievement motivation is considered an important factor in learning because, with this motivation, students will try to achieve standards of perfection in learning (Syamsinar et al., 2023).

The Effect of Parents' Attention on Learning Motivation

Based on Table 6, the magnitude of the parameter coefficient of the influence of the parental attention variable on learning motivation (original sample) is 0.734, which means there is a positive influence between the two variables. Or it can be interpreted that the higher the parental attention, the better the motivation to learn. Then the resulting T-statistic value is 21.066, which means that the result is said to be significant because the t-statistic value is greater than the t-table (21.066 > 1.96) or it can be said that the hypothesis is accepted. This is in line with existing research that parental attention will

directly affect children's learning motivation which in turn has an impact on children's learning achievement at school (Afrida, 2017). Parents are an essential factor in supporting children's motivation to learn. Parents' supervision and direction will influence children's motivation to participate in teaching and learning activities well at home and school (Mayona et al., 2022). Parental attention has a good impact on children, such as increasing children's enthusiasm and motivation to learn. Parental attention and guidance at home will influence students' learning readiness, both studying at home and at school. The attention given by parents to their children can motivate students to carry out their activities, including motivating children to learn (Safitri et al., 2018).

The Effect of Learning Motivation on Creativity

Based on Table 6, the magnitude of the parameter coefficient of the influence of the learning motivation variable on creativity (original sample) is 0.285, which means there is a positive influence between the two variables. Or it can be interpreted that the higher the motivation to learn, the better the creativity will be. Then the resulting T-statistic value is 4.137, which means the result is said to be significant because the t-statistic value is greater than the t-table (4.137 > 1.96) or it can be said that the hypothesis is accepted. This is in line with existing research that there was a positive and significant influence of motivation and learning style together on student creativity (Prasela et al., 2022). Creativity plays a very important role so that students are better prepared to face the development of science and technology (Nurulwati., 2023).

The Effect of Parents' Attention on Learning Achievement

Based on Table 6, the magnitude of the parameter coefficient of the influence of the parental attention variable on learning achievement (original sample) is -0.259, which means there is a negative influence between the two variables. Or it can be interpreted that the lower the parental attention, the better the learning achievement will be. Then the resulting T-statistic value is 2.910, which means the result is said to be significant because the t-statistic value is greater than the t-table (2.910 > 1.96) or it can be said that the hypothesis is accepted. This is in line with existing research that parental attention will directly affect children's learning motivation which in turn has an impact on children's learning achievement at school (Afrida, 2017). The family has an important role in their children's education, parents' attitude that cares for the child can make a child being excellent in education because the child's behavior can be influenced by the attention of both parents (Nofrizal et al., 2020).

The Effect of Creativity on Learning Achievement

Based on Table 6, the parameter coefficient of the influence of the creativity variable on learning achievement (original sample) is 0.025, which means there is a positive influence between the two variables. Or it can be interpreted that the higher the creativity, the better the learning achievement will be. Then the resulting T-statistic value is 0.330, which means the result is said to be not significant because the t-statistic value is smaller than the t-table (0.330 < 1.96) or it can be said that the hypothesis is rejected. This is not in line with existing research that there were positive significant relationships between creativity and achievement (Nami et al., 2014). Therefore, it is necessary to carry out further research on creativity and learning achievement from various factors because from the results of the research conducted it was found that there is no significant relationship between creativity and learning achievement.

The Effect of Parents' Attention on Creativity

Based on Table 6, the parameter coefficient of the influence of parental attention on reading habits (original sample) is 0.107, which means there is a positive influence between the two variables. Or it can be interpreted that the higher the attention of parents, the better creativity will be. Then the resulting T-statistic value is 1.012, which means the result is said to be not significant because the t-statistic value is smaller than the t-table (0.330 > 1.96). Therefore, it is necessary to carry out further research on parents' attention and creativity abilities from various factors because from the results of the research conducted it was found that there is no significant relationship between parents' attention and creativity. This is not in line with existing research that there is a significant direct influence of parental attention on student creativity (Adzkia, 2016).

Conclusion

A total of 15 hypotheses were proposed, 9 hypotheses were accepted and 6 hypotheses were rejected. Acceptance and rejection of the hypothesis are based on data analysis that has been carried out using the SmartPLS application. There are various obstacles in carrying out research, but the research can still be carried out well. In compiling research variables that influence scientific literacy, they are limited to 5 variables, namely reading habits, learning motivation, learning achievement, parental attention and creativity. As for the rejection of the hypothesis, it can be assumed that there are other variables that can influence scientific literacy more significantly.

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The authors declare no conflict of interest.

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