

# Parenting Patterns with Science Literacy Skills of Four Grade Elementary School Students

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## ABSTRAK

Sebagian besar siswa masih memiliki minat yang rendah terhadap ilmu pengetahuan alam. Hal ini dapat disebabkan oleh pola asuh orang tua yang kurang mendukung dan memotivasi. Penelitian ini bertujuan untuk menganalisis hubungan yang signifikan antara pola asuh orang tua dalam meningkatkan kemampuan literasi sains siswa pada aspek sikap. Penelitian ini merupakan jenis penelitian *ex post facto* tipe korelasional dengan populasi sebanyak 98 siswa dan sampel berjumlah 30 responden. Pengambilan sampel menggunakan teknik *proportionate random sampling*. Metode dan instrument pengumpulan data dalam penelitian ini menggunakan metode non-tes yaitu angket (kuesioner). Teknik analisis data menggunakan teknik kuantitatif, untuk uji hipotesis menggunakan analisis regresi linear sederhana. Hasil penelitian ini menunjukkan bahwa  $H_0$  ditolak dan  $H_1$  diterima, yang berarti bahwa terdapat hubungan yang signifikan antara pola asuh orang tua dengan kemampuan literasi sains siswa karena dengan adanya penerapan pola asuh yang baik maka akan meningkatkan kemampuan literasi sains pada anak. Implikasi penelitian ini diharapkan menjadi bahan kajian bagi guru dan orang tua dalam memberikan pola asuh yang baik terhadap anak.

## ABSTRACT

Most students still have low interest in science. This can be caused by parenting patterns that are less supportive and motivating. This study aims to analyze the significant relationship between parenting patterns in improving students' scientific literacy skills in the attitude aspect. This study is a type of *ex post facto* correlational research with a population of 98 students and a sample of 30 respondents. Sampling using stratified random sampling technique. The method and instrument for data collection in this study used a non-test method, namely a questionnaire. The data analysis technique used quantitative techniques, for hypothesis testing using simple linear regression analysis. The results of this study indicate that  $H_0$  is rejected and  $H_1$  is accepted, which means that there is a significant relationship between parenting patterns and students' scientific literacy skills because with the implementation of good parenting patterns, it will improve children's scientific literacy skills. The implications of this study are expected to be study material for teachers and parents in providing good parenting patterns for children.

## 1. INTRODUCTION

Scientific literacy is the ability to understand scientific concepts and processes and apply science to solve problems in everyday life (Fuadi et al., 2020; Marfilinda & Andoko, 2022). The essence of scientific literacy has four aspects that are more focused and interconnected, namely knowledge, context, competence and attitude. Scientific literacy is an important aspect of education that emphasizes the development of students' skills in logical thinking and acting critically, creatively, innovatively and plays a very important role in understanding the environment, health, economy, modern social, and technology (Pratiwi et al., 2019). Science education is here to shape ideas, actions, concern for oneself, society, and the universe, and to build responsible human character (Dewi et al., 2022; Fatah et al., 2020). Therefore, scientific literacy skills are very important for students with high or good achievement levels, so that the quality of education in Indonesia can improve and compete with other countries.

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However, science literacy in Indonesia is still relatively low compared to the international average, as evidenced by the results of the 2022 PISA survey in Indonesia, which experienced a decline in the science literacy score from the 2018 PISA results, from 396 to 383. The low results of Indonesia's PISA cannot be separated from the fact that most students still show limited science literacy skills, because students tend to have difficulty understanding, analyzing, and solving science problems, one of which is during the PISA test. Based on the results of the PISA survey from 2000 to 2018, Indonesia showed fluctuations in students' science literacy rankings and scores. Science literacy really needs to be developed from an early age, and can start from elementary school. The problem is in line with the results of observations conducted at SD Negeri 1 Banjar Jawa, Buleleng District, Buleleng Regency with several homeroom teachers and grade 4 students. The results of interviews with all homeroom teachers in the relevant elementary school found the fact that students have low enthusiasm when the learning process takes place, only a few students are active when learning in class takes place, especially when the subject of Natural Sciences (*IPA*). Several students are also negligent of their duties as students, such as rarely coming to class without permission and rarely doing homework (*PR*) that the teacher has given.

During the learning process, the teacher also revealed that students were often noisy because they were talking about unimportant things with their friends, and there were even 4th grade students who still stuttered when reading. In science learning, there are still many students who are unable to face challenges and difficulties. Many students do not repeat their learning at home, so their ability to remember and master the material is still lacking, especially in science learning. Based on research that has been conducted at the elementary school level, 70% of fifth grade students in one elementary school have low science literacy skills (Fatah et al., 2020; Kealy & Devaney, 2023). Another supporting study was also conducted that the scientific literacy ability of fifth grade students of SD Negeri 04 Pancuang Soal Pesisir Selatan in the overall knowledge aspect was 51.3%, including in the "Very Poor" category. The results of this study indicate that many students are still unable to understand and identify scientific literacy (Marfilinda & Andoko, 2022; Winarti et al., 2021).

Low scientific literacy skills are caused by several influencing factors, both external and internal factors (Ameliya & Setyawan, 2020; Fatah et al., 2020). Several internal factors that affect scientific literacy skills, namely inadequate nutritional intake, low student self-confidence concentration, students are not yet able to understand basic scientific concepts, students' abilities are still lacking in interpreting information provided in images or tables, students' interest in reading, especially about scientific concepts, is lacking (Adiwiguna et al., 2019; Pratiwi et al., 2019). External factors that influence scientific literacy skills include students not understanding the basic concepts of science, science learning in schools is still done conventionally, students' abilities are lacking in interpreting information provided in images or tables, students' interest in reading, especially about scientific concepts, lack of school facilities that support science, and neglect from families (Kelana & Pratama, 2019; Yusmar & Fadilah, 2023). The external factor that has a greater influence on students' scientific literacy skills is the family environment factor (Budiman et al., 2021; Narut & Supradi, 2019).

The role of parents can support children's learning interests and skills, one of which includes scientific literacy skills. Parents' knowledge and experience are much broader, so they are very suitable for helping children connect everyday experiences with relevant scientific concepts or practices (Yanti et al., 2020; Irsan, 2021). Previous research has shown that parents can help children learn science concepts from everyday experiences at home through fun and imaginative activities, such as reading story books or discussing science, applying science concepts in everyday activities by cooking, gardening, or assembling science puzzles and encouraging children's curiosity through simple experiments or visits to places of scientific interest (Riyadli, 2023; Setioko & Ding, 2022). The greater the guidance given by parents to children, the higher the learning outcomes that children will get, because children feel they are getting attention from their parents so that children are able to develop their potential optimally. It can be said that family factors, especially parents, have a very important influence on children's scientific literacy abilities (Harlina et al., 2020; Ramdhani & Gunawan, 2022).

Parenting patterns are one of the most important factors to consider in improving students' scientific literacy skills, this is because the application of different parenting patterns will produce different children's abilities. When children are raised with parenting patterns that encourage exploration and discussion of science and technology, they tend to have better scientific literacy skills (Harefa & Sarumaha, 2020; Mabsutsah et al., 2021). Parents can help their children to develop their scientific literacy skills by providing good and supportive parenting, especially in science learning at home (Syah et al., 2020; Arlis et al., 2020). Parenting patterns that support science learning at home can provide opportunities for children to learn science actively and enjoyably. This can help students develop critical and creative thinking skills that are important skills in science literacy. Therefore, parenting patterns can have a relationship with students' science literacy skills. Students who receive better parental support in their learning activities, better intellectual stimulation, and better communication with their parents tend to have better science literacy skills (Nasution et al., 2019; Noviyanto et al., 2021)

Given that good scientific literacy skills may be due to how parents implement parenting patterns, it is very important to understand how children perceive their parents' parenting patterns (Fatah et al., 2020; Syah et al., 2020). Research has shown that children's perceptions of parenting styles often differ from the parents' own perceptions (Sunariyadi & Andari, 2021; Mabsutsah et al., 2021). Therefore, by exploring students' perspectives on parenting patterns, a deeper understanding can be gained regarding how parenting patterns are perceived and interpreted by children, and how these perceptions affect their scientific literacy skills.

Based on the description above, it was found that students' scientific literacy skills are still relatively low due to several factors, both external and internal. Previous research related to parenting patterns as an external factor, was more dominant in focusing on the relationship between learning achievement, morals and children's morals. This research focuses on the relationship between parenting patterns and students' scientific literacy skills. In this regard, a study was conducted to analyze the relationship between parenting patterns and students' scientific literacy skills in grade IV of SD Negeri 1 Banjar Jawa. With this research, it is hoped that it can be a reading material and study for teachers and parents of students in providing appropriate parenting patterns that affect students' scientific literacy skills.

## 2. METHOD

This study uses a quantitative approach, which is included in the type of *ex post facto* research that relates parenting patterns to students' scientific literacy skills. *Ex post facto* research is directed at studying events that have occurred and then tracing back to the past to find out the factors that caused the event (Purwanto, 2020). This study examines two variables, namely the independent variable (X) parenting patterns and the dependent variable (Y) children's scientific literacy skills. The population in this study was grade IV of SD Negeri 1 Banjar Jawa in the 2023/2024 academic year, totaling 98 students. The sampling was determined by the existence of population equality. The equality test was carried out using One Way Analysis of Variance (ANOVA A). The data used for the equality test were the students' scientific literacy ability scores in the attitude aspect. ANOVA analysis has testing criteria, namely if the sig value > 0.05 in the ANOVA A test table with a significance level of 5%, then H<sub>0</sub> is accepted and H<sub>1</sub> is rejected, so that the group is declared equal. Sampling used random sampling technique. Samples were taken randomly by drawing lots. To measure the number of samples in each class IV study group, the proportionate random sampling technique was used. Based on this, samples were obtained for each class, namely class IVA as many as 10 students, IVB as many as 12 students and IVC as many as 8 students.

The data collection method used in this study was a non-test, namely a questionnaire. The instrument used was a questionnaire on parenting patterns and students' scientific literacy skills in terms of attitudes. The instrument grid used in this study can be seen in Table 1, and Table 2.

**Table 1.** The Parenting Pattern Questionnaire Grid

Variables	Sub Variables	Indicator
Parenting Patterns	Authoritarian Parenting Style	In certain activities, parents and children insist on their respective positions. Parents tend to impose their will Parents insist on managing all of their children's affairs without their children's consent in everyday life. Parents scold and punish children if they make mistakes
	Permissive Parenting Style	Parents tend to give children freedom to do things without sufficient supervision. Parents give their children the freedom to express their wishes Parents give their children what they want, but do not intensively monitor what their children do. When children make mistakes or achieve something, parents tend to be indifferent.
	Democratic Parenting Pattern	The relationship between parents and children is warm Parents are responsive Parents give opinions and enjoy discussing things. Parents reprimand and provide explanations regarding good and bad behavior when children do something wrong.

**Table 2.** The Science Literacy Skills Grid Attitude Aspect

No	Dimensions	Indicator
1.	Interest in Science and Technology	Curiosity about science and issues related to science and business. Willingness to acquire additional knowledge and skills related to science, using a variety of resources and methods. Interest more advanced knowledge of science, including considerations in everyday life.
2.	Respecting the Scientific Approach	Commitment to evidence as the basis for belief in explaining science. Be open to other people's findings. Be honest in collecting data.
3.	Environmental Awareness	Awareness of environmental problems. Concern for the environment and sustainable living. Environmentally friendly behavior.

Instruments in a study must meet the requirements of validity and reliability, this is done in order to obtain valid or accurate research results. For this reason, a content validity test is carried out using the Gregory formula. Item validity uses the product moment correlation formula. To test the level of instrument reliability, the Alpha-Cronbach coefficient formula is used. Data analysis in this study uses a simple linear regression analysis technique to find the effect of parenting patterns on children's learning discipline. In this study, the data that the author will collect is quantitative, namely where the data is in the form of numbers. In this study, descriptive statistical analysis is used to determine how parenting patterns are and to determine the science literacy skills of grade IV students at SD Negeri 1 Banjar Jawa. The descriptive results of variable data are then presented in the form of a polygon curve. The high and low quality of the variables is determined based on the ideal average score (Mi) and the ideal standard deviation (SDi).

The classical assumption test is a prerequisite for regression analysis, this test must be met so that the estimation of parameters and regression coefficients is not biased. The classical assumption test used in this study is the normality test and the linearity test. The normality test is a data test which is to determine whether the distribution of data is normally distributed, in the normality test of this research data using the Kolmogorov-Smirnov test with the help of SPSS. In this study, to determine the linearity of the data between these variables, a calculation analysis is used with the F test formula with the help of SPSS according to the criteria or basis for decision making. The hypothesis analysis in this study uses simple linear regression analysis with the aim of testing the significance of the influence of parenting patterns on the scientific literacy skills of grade IV students of SD Negeri 1 Banjar Jawa. Simple Linear Regression or called simple linear regression, is a linear regression analysis is an analysis to determine the influence or linear relationship between independent variables and dependent variables.

### 3. RESULTS AND DISCUSSION

#### Result

In this study, a significant relationship was found between parenting patterns and the science literacy skills of fourth grade students at SD Negeri 1 Banjar Jawa. The results of the z-score calculation to see the tendency of parenting patterns in this study showed that the tendency of parenting patterns applied by students' parents was democratic, which was 50%. 26.67% of parents used authoritarian parenting patterns, and 23.33% used permissive parenting patterns. For more clarity, the data above is presented in [Table 3](#).

**Table 3.** The Parenting Tendency Level

No.	Parenting Pattern Categories	Frequency	%
1.	Authoritarian	8	26.7%
2.	Permissive	7	23.3%
3.	Democratic	15	50.0%
<b>Amount</b>		<b>30</b>	<b>100%</b>

Based on [Table 3](#), from the results of data analysis, it can be concluded that the level of parenting tendencies applied by parents to grade IV students of SD Negeri 1 Banjar Jawa is Democratic parenting, with a percentage of 50% with a frequency of 15 students. Based on the results of the descriptive analysis of scientific literacy skills, a mean (average) value of 76.27 was obtained with the highest score achieved being 95 and the lowest score being 60. In order to create a data frequency distribution table, several data

are needed such as the number of interval classes, score ranges, and class lengths. Based on the calculations that have been carried out, the results presented in Figure 1.

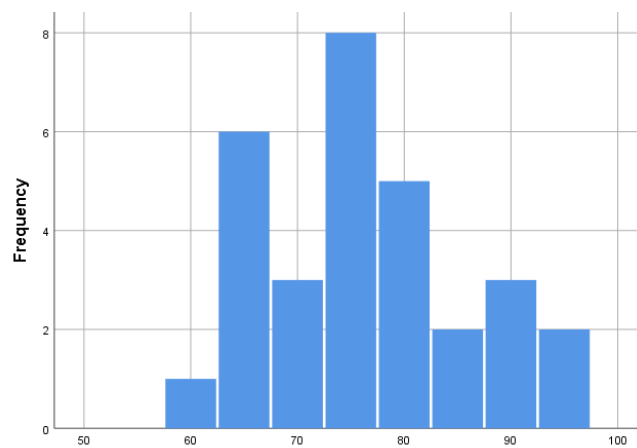


Figure 1. The Science Literacy Ability Graph

Based on Figure 1, then the tendency of the results of the science literacy ability of students of SD Negeri 1 Banjar Jawa is in the high category. Before testing the hypothesis, normality and linearity tests were carried out. The results of the normality test calculation using Kolmogorov-Smirnov. Based on data from the parenting pattern variable with three types of parenting, namely authoritarian parenting  $0.135 > 0.05$ , permissive parenting  $0.055 > 0.05$ , democratic parenting  $0.113 > 0.05$ , and data from the science literacy ability variable has a significance value of  $0.069 > 0.05$ . Thus, it is said that all of these data are normally distributed. The calculation of the linearity test using SPSS 25 assistance with the decision rule is if the significance value  $> 0.05$ , then there is a linear relationship between the independent and dependent variables. Based on the calculation, the results in the significant column of the deviation from linearity row with a result of 0.257, meaning that it can be concluded that the variables X in democratic parenting and Y have a linear relationship.

In this study, the hypothesis test uses the Pearson Product Moment Correlation method. This correlation is used to test the relationship between parenting variables and science literacy ability variables. The hypothesis test in this study uses SPSS 25 and the results of the correlation coefficient are presented in Table 4.

Table 4. The Results of Correlation Analysis of Authoritarian, Permissive, Democratic Parenting with Science Literacy Ability

Correlation Statistics		Authoritarian Parenting Style	Permissive Parenting Style	Democratic Parenting Pattern	Science Literacy
Authoritarian Parenting Style	Pearson	1	0.066	0.077	0.117
	Correlation				
	Sig. (2-tailed)		0.727	0.685	0.540
Permissive Parenting Style	N	30	30	30	30
	Pearson	0.066	1	0.124	0.055
	Correlation				
Democratic Parenting Pattern	Sig. (2-tailed)	0.727		0.515	0.771
	N	30	30	30	30
	Pearson	0.077	0.124	1	0.713
Science Literacy	Correlation				
	Sig. (2-tailed)	0.685	0.515		0.000
	N	30	30	30	30
Authoritarian Parenting Style	Pearson	0.117	0.055	0.713	1
	Correlation				
	Sig. (2-tailed)	0.540	0.771	0.000	
Permissive Parenting Style	N	30	30	30	30

Based on Table 4, meaning that there is one type of parenting pattern that has a significant relationship with students' scientific literacy skills, namely democratic parenting. This study used a sample of 30 respondents, with a 5% error rate of 0.361. Therefore, it can be said that variables X1 and X2



do not have a significant relationship with scientific literacy skills. However, variable X3 has a significant relationship with scientific literacy skills. Because one of the three variables are, it can be said that H0 is rejected and Ha is accepted. This means that there is a significant relationship between parenting patterns and the scientific literacy skills of fourth-grade students of SD Negeri 1 Banjar Jawa.

## Discussion

The difference in contribution to each parenting pattern applied to children proves that it can affect the achievement of children's learning outcomes. Different types of parenting patterns applied will also have different learning outcomes for each child. Democratic parenting has proven to be more effective in improving students' scientific literacy skills, because in this type of parenting, parents support their children according to their talents or interests (Faqih et al., 2022; Kusuma et al., 2021). In this parenting pattern, parents and children have a warm relationship, so that the family environment shows open communication, full of affection, and attention that makes children feel calm, comfortable, and safe. Such family environment conditions have a very large role in the personality and character of children, so that they can influence scientific literacy skills, especially in the aspect of attitude (Nida & Kuntari, 2021; Shofuroh & Wulandari, 2024). The attitude of parents to children at home is warm, then the child's intelligence can develop to a higher level because the child is not in a state of stress. Parents with this parenting pattern can be a bridge for children to develop an interest in science, because parents will support the child's curiosity about further curiosity about natural phenomena (Sari & Jamrizal, 2023; Ramdhani and Gunawan, 2022).

Children with democratic parenting will be reprimanded and given an explanation when they make a mistake. Parents will advise their children when they do something bad or a mistake whether intentionally or not. This parenting pattern never punishes children with physical violence, but parents will reprimand and advise or explain to the child that what has been done is wrong or not good (N. Hidayatullah et al., 2023; Sakung et al., 2022). This parenting pattern can improve scientific literacy skills, especially in the attitude aspect, because at home children are accustomed to doing any daily activities without any pressure. Moreover, children who are accustomed to being involved in environmentally friendly activities and parents who usually give advice about the importance of preserving nature will make children care about the surrounding environment. This is in line with the opinion that children who receive democratic parenting patterns are able to develop the ability to control their own behavior, because parents work together with children in anything.

Parenting patterns that are characterized by many strict rules and often force children to obey them and limit children from acting freely on their own behalf are authoritarian parenting patterns. According to Hurlock in (Shofuroh & Wulandari, 2024; Mardiah & Ismet 2021), parents with this parenting style require their children to do what their parents want. Parents with this parenting style tend to like to force and control children without the child's consent, so they tend to inhibit the child's development, especially the child's interest in science. The power of parents in authoritarian parenting can have a negative impact on their social development. Parents and children often insist on their respective positions, and this can be a conflict because the child feels that he is not supported and the parents tend to be more dominant. Children who are raised with authoritarian parenting are often unhappy, afraid, and tend to want to compare themselves to others, are easily offended and behave aggressively, and are fearful (Ramdhani & Gunawan, 2022; Taib et al., 2020).

This parenting pattern also tends to force the child's will and regulate all the child's affairs without asking the child's opinion. Parents who apply this parenting pattern can have an impact on the child which makes it difficult for him to choose something he likes. Parents in this parenting pattern are classified as requiring him to follow the rules that he has applied to the child unilaterally. Children tend to be afraid to ask and explore further knowledge, because they are used to following the orders that their parents want without their consent which triggers the child to be unable to be honest about his feelings (Mil & Ningsih, 2023; Tamba, 2021). This can form a child's self-concept to be negative, because children tend to feel pressured, constrained, less independent, and less confident. Children tend to be unable or not accustomed to discussing which can cause children to be less able to be open to other people's points of view, so they are less able to appreciate the scientific approach. Parents with this type of parenting tend to impose their will and do not give children the opportunity to express themselves.

Parents who apply an authoritarian parenting style often scold and punish children when they make mistakes without listening to the reasons for doing so. Parents with an authoritarian parenting style often give children very strict limits and punish them if their parents' orders or desires are not fulfilled (Salenussa & Soetjningsih, 2022; Shofuroh & Wulandari, 2024). Authoritarian parenting can cause children to become stubborn, unruly, and disobedient to their parents. The higher the authoritarian parenting, the lower the child's social interaction and other abilities. Awareness of the surrounding things may also be less mastered by children, because children are used to not being involved in the decision-making process related to environmental problems.

Parenting style where parents always allow children to do anything without supervision is a permissive parenting style. Parents are responsive and not too demanding and tend not to apply discipline in everyday life. In this parenting, parents tend to provide welfare to children but this parenting can trigger low achievement in children because children are given freedom without supervision. Children will have less interest in science, because they are used to being free without a target to complete a task. Children who are given excessive freedom and with less supervision from parents can provide a great opportunity for children to fall into bad things and move from one interest to another without developing them first (RM Hidayatullah et al., 2024; Parinduri & Irwan, 2024). Parents in this parenting style also give children the freedom to express their desires. However, this parenting style has a negative effect on child development because children are left free and there is no encouragement to explore or target to complete tasks that make children less interested in learning more deeply about natural phenomena. Children who are educated with this parenting style will be aggressive when their desires are not fulfilled.

Permissive parenting causes parents to tend to give their children what they want and are usually indifferent to what their children do (Khosiah & Sayekti, 2021; Ruhdiyanto et al., 2023). Parents tend to be busy with their own affairs. Parents are very uninvolved in this parenting, because parents prefer their own interests. Parents and children rarely discuss things that can help the child's development. This parenting style can make children unaccustomed to respecting other people's opinions and less open, because at home they are rarely invited to discuss by parents. Parents provide less supervision when children make mistakes or rarely give appreciation when children achieve something. Permissive parenting has almost no rewards given to motivate children when they succeed in doing good or achieving something (Hanifah et al., 2021; Ruhdiyanto et al., 2023). Parents tend to follow what their children want without first thinking about whether what the child asks for is good for their development. Usually children with this upbringing tend to act according to their wishes as they please, dare to argue with others, and are difficult to advise because they are used to living freely without rules. Children can play as they please without remembering the time to study.

Permissive parenting can have a negative effect on child development, where the more often and the higher the application of permissive parenting, the lower the social behavior shown by the child. Parents in this parenting style are too soft, not firm, and give freedom without any norms that must be followed by them. Children can tend to have less environmental awareness, because parents do not accustom children to be responsible and the consequences of their actions towards the environment. The attitude of parents in this parenting style may be because parents are very affectionate (over affection) towards their children (Charisma et al., 2023; Ruhdiyanto et al., 2023).

The implication of this study is that the implementation of parenting patterns at home has a positive influence on scientific literacy skills if the parenting patterns implemented are good. This can have implications for improving the parenting patterns implemented. First, parents need to be trained to improve parenting patterns. Second, schools need to facilitate regular training for parenting patterns. This study has limitations, namely the scope of the study which only focuses on one school, namely SD Negeri 1 Banjar Jawa. In addition, another limitation is that data collection on parenting patterns and scientific literacy skills only uses questionnaires as a data collection method. Questionnaires tend to be susceptible to the influence of subjective perceptions and opinions of respondents, so that the answers given are sometimes biased. Therefore, it is hoped that further research can conduct research with a wider population and more varied data collection methods.

#### 4. CONCLUSION

Based on the results of the research and statistical data analysis that have been carried out, it can be concluded that there is a positive relationship between parenting patterns and students' scientific literacy skills. Teachers as educators should be able to know each parenting pattern of each student, so that they can know the characteristics of the student from the parenting pattern. This can help teachers in treating students according to their characteristics, because one of the social characteristics of children is influenced by parental parenting patterns.

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