

## RELATIONSHIP BETWEEN STUDENT COGNITIVE DEVELOPMENT AND STUDENT DISCIPLINE CHARACTER IN HIGH SCHOOL

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### Abstract :

Effective student cognitive development can be seen when students are in junior high school. This study aims to answer the research question, namely how is the relationship between cognitive development variables and the disciplinary character of high school students in physics subjects. The method used in this research is a mixed quantitative and qualitative method with a total of 50 students. The results of the study are the correlation test which states that the relationship with the data results is less than 0.05, which means that there is a relationship between the two variables tested. The conclusion of this study is that there is a relationship between cognitive development and the disciplinary character of high school students in physics subjects. The novelty of this study is that no comparisons were made for different schools to find out the relationship between cognitive development variables and disciplinary character. The limitations of this study are only comparing two classes.

Keywords: Cognitive Development; Discipline Character; Physics

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## INTRODUCTION

Physics as an attitude is a variety of things that must be developed by scientists, especially when seeking or developing new knowledge, such as responsibility, curiosity, discipline, patience, and openness to other people's opinions, beliefs, opinions, and values. The attitude that a person must have is called a scientific attitude. Attitudes can be broadly divided into two groups (Maison et al., 2018; Sofnidar et al., 2019; Choudhary et al., 2019; Bogusevchi et al., 2020). That is, a set of attitudes that support the problem-solving process and a set of attitudes that emphasizes a certain attitude towards science, a way of looking at the world and may be useful for future professional development (Salehi et al., 2019; Widyaningsih et al., 2021; Tenti, 2021; Darmaji et al., 2023; Kamid et al., 2022). Learning and studying physics can be divided into five important categories (1) The learner already has prior knowledge, (2) Learning is the process of building knowledge based on existing knowledge, (4) Learning is a change in the perception of learning, (4) The process of building knowledge takes place in a certain social context, (5) Students are responsible for their learning process.

Cognitive is a child's thinking process, which raises the ability to connect, assess and consider events or events. Children's cognitive development involves progressive learning processes such as attention, memory, and logical thinking (Syahrial et al., 2019; Veronica, 2018; Less et al., 2020;

Rakesh et al., 2021; Masitah & Pasaribu, 2022). Cognitive development is the level of a child's ability to think. The development of these skills is important so that your little one can process information, learn to evaluate, analyze, remember, compare and understand cause and effect relationships (Yamauchi et al., 2019; Juniwati, 2020; Holt et al., 2020; Keizer et al., 2020; Babik et al., 2022; Sabil et al., 2023). The development of cognitive skills is often linked to genetic factors, but much of it can actually be learned. Thinking and learning abilities can be improved by practicing them or providing the right stimulation.

Character education builds strong, resilient, resilient and dynamic human beings who are responsible for their progress and the tasks they carry out of the scholarships that are built and implemented from the scholarships themselves (Farhani, 2019; Setyono & Widodo, 2020; Syahrial et al., 2020). Character education is closely related to discipline because it is one of the keys to individual success. Therefore, building personality education for students is not as easy as turning the palm of the hand and requires a lot of extra time and processes to guide the students themselves (Asiyah, 2020; Putri, 2021). All of that must come from the institutional environment by implementing a quality system and a positive environment. Discipline is very important for students. Discipline is not only done for the rules and all the rules and policies that must be followed, but also for the confidence to achieve a high level of success (Farlina & Yusminar, 2020; Oktaviani, 2020). For example time discipline: Students who work with discipline tend to value time and complete assignments according to the time allotted (Al-Samarraie, 2020; Asrial et al., 2020; Lestari, 2020; Persada & Nabella, 2023).

The importance of this research is very important, namely to find out the relationship between cognitive development variables and disciplinary character in physics subjects at the high school level so that they can be used as learning for further research. This research is in line with previous research conducted by (Lailah & Tenri, 2018), which examined cognitive development in student learning. In this study said that the cognitive development of students is very important for students to have. In this study, the variables used were cognitive development and disciplinary character. However, this study has a weakness, namely it only tests at a level not at a comparison of two schools to find out more specifically cognitive development and disciplinary character, namely in two or more schools. This study aims to answer the research question, namely how the results of student descriptive statistics on cognitive development variables and disciplinary character in high schools in physics subjects. Is there a relationship between cognitive development and the disciplinary character of students in senior high schools in physics subject.

## **RESEARCH METHOD**

This study used a mixed method research with an explanatory design. Mix method research is research that combines quantitative research methods and qualitative research methods (Putri et al., 2022). Explanatory design can be carried out with several stages of research, namely starting from collecting data, analyzing data and formulating quantitative analysis results, then continuing with data collection, analyzing and formulating qualitative data, and ending with interpreting the results of the research (Aziz et al., 2021; Salma, 2020). This research is used to produce a better understanding of the research problem.

The population and research sample are research studies with characteristics and other things that will be needed in a study. The population in this study were 50 high school students from senior high school 10 Jambi City and senior high school 5 Jambi City. The sampling technique is purposive sampling. The subjects taken which consisted of 25 students from senior high school 10 Jambi and 25 students senior high school 5 Jambi City.

In data collection, the first activity that must be carried out is to select students based on the categories provided by the researcher, then provide a questionnaire and interviews about students' cognitive development and disciplinary character. This questionnaire is addressed to students, namely 50 students who are the subjects of this study, which aims to determine the relationship between cognitive development and disciplinary character. Then the observation sheet data is processed using the SPSS application. The use of the SPSS application serves to view descriptive statistics, in the form of mean, min, max, percentage, and student categories. The results were tested using SPSS by carrying out three tests, namely descriptive statistical tests, assumption tests, and hypothesis testing. In the

assumption test two tests are carried out, namely the normality test and the linearity test. The normality test functions to find out whether the data being tested has a normal distribution. The linearity test serves to see if the data is distributed linearly or not. Then test the hypothesis in the form of a correlation test. Correlation test to determine the relationship between cognitive development variables and disciplinary character. These tests were then tested using SPSS 26 to obtain accurate results. The following is a research procedure (Ernawati et al., 2021).

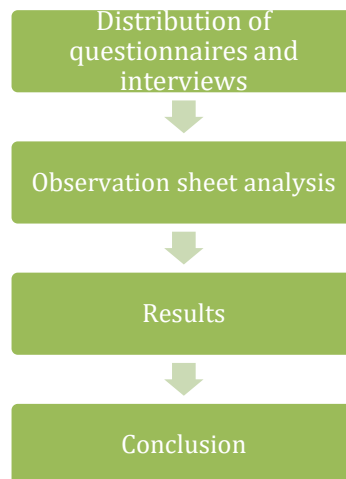


Figure 1. Research procedure

The instrument in this study used 2 types of instruments, namely questionnaires. The questionnaire used consisted of cognitive development sheets and sheet discipline character. As well as interviews conducted with student. There are 22 valid statement items on this cognitive development variable instrument using a Likert scale. The scale consists of 4 points with a very appropriate score of 4 very bad, 3 not good, 2 good, 1 very good. Each statement is representative of each parent communication indicator. There are 10 valid statement items on cognitive development variables. There are 12 valid statement items on the disciplinary character variable.

Table 1. Description of cognitive development and disciplinary character in physics subjects

Variable	Item Number Statement
Cognitive development	1,2,3,4, 5,6,7,8,9,10,11
Discipline character	12,13,14,15,16,17,18,19,20,21,22

Because the observation sheet on cognitive development variables and disciplinary character in physics subjects in high school uses a likert scale which consists of 4 categories, there are intervals in each category, and the intervals in each category can be seen in table 2.

The description of the category of student discipline characters in physics subjects is as follows:

Table 2. Cognitive development communication categories and disciplinary characters in physics subjects

Category	Intervals	
	Cognitive development	Discipline character
Very not good	11.0 – 19.25	12.0 – 21.0
not good	19.35 – 27.5	21.1 – 29.0
good	27.6 – 35.75	39.1 – 38.0
very good	35.85 – 44.0	38.1 – 48.0

The data analysis technique used was random sampling because the samples used were senior high school 5 Jambi City and senior high school 10 Jambi City students who studied physics subjects

according to the variables of cognitive development and students' disciplinary character. The use of random sampling in this study saves time, money and effort, and also allows for more precise research results to be studied, because all data from smaller students will be easier to analyze in detail.

**RESULTS AND DISCUSSION**

The following describes the results of descriptive statistics on the variables of cognitive development and disciplinary character. Where are the results obtained from distributing questionnaires and interviews at senior high school 10 Jambi City and senior high school 5 Jambi City. Descriptions of students' cognitive development variables in physics subjects are shown in the following table.

Table 3. Description of students' cognitive development variables in physics subjects

Class	Categories	Intervals	F	%	Means	Med	Min	Max
senior high school 10 Kota Jambi	Very not good	11.0 – 19.25	0	0	3.6	3.0	2.0	4.0
	Not good	19.35 – 27.5	4	20				
	Good	27.6 – 35.75	14	56				
	Very good	35.85 – 44.0	7	28				
senior high school 5 Jambi City	Very not good	11.0 – 19.25	4	16	3.2	3.0	1.0	4.0
	not good	19.35 – 27.5	6	24				
	good	27.6 – 35.75	11	44				
	very good	35.85 – 44.0	4	16				

From the description of the table above it can be seen that the comparison with both categories at and senior high school 10 Jambi City is higher than and senior high school 5 Jambi City so that it can be said that and senior high school 10 Jambi City is superior to and senior high school 5 Jambi City in the variable character of democracy. Discipline character variable descriptions are shown in the following table:

Table 4. Discipline character variable description

Class	Categories	Intervals	F	%	Means	Med	Min	Max
Senior high school 10 Jambi City	Very not good	12.0 – 21.0	3	12	3.5	3.0	1.0	4.0
	not good	21.1 – 29.0	6	24				
	good	39.1 – 38.0	11	44				
	very good	38.1 – 48.0	5	20				
Senior high school 5 Jambi City	Very not good	12.0 – 21.0	5	20	3.3	3.0	1.0	4.0
	Not good	21.1 – 29.0	7	28				
	Good	39.1 – 38.0	10	40				
	Very good	38.1 – 48.0	2	8				

From the description of the table above it can be seen that the comparison with the good category in senior high school 10 Jambi City is higher than senior high school 5 Jambi City so that it can be said that senior high school 10 Jambi City is superior to senior high school 5 Jambi City in the disciplinary character variable.

The normality test of cognitive development and students' disciplinary character is explained in the following table:

Table 5. Test the normality of cognitive development and disciplinary character of students

Class	Variable	Kolmogorov-Smirnov		Shapiro-Wilk			
		Statistics	Df	Sig.	Statistics	Df	Sig.
Senior high school 10 Jambi City	Cognitive development	.0346	25	.200	.448	25	.334
Senior high school 5 Jambi City	Discipline character	.0345	25	.200	.449	25	.335

Based on the results of the table above, it can be concluded that the data is normally distributed. The normality test was obtained by the Kolmogorov-Smoirnov test, a significance value of  $> 0.05$ .

The linearity test of cognitive development and disciplinary character is explained in the following table:

Table 6. Linearity test of cognitive development and discipline character

Class	Variable	N	Sig.
Senior high school 10 Jambi City	Cognitive development	25	0.15
Senior high school 5 Jambi City	Discipline character	25	0.16

Based on the table above it can be concluded that the linearity test of the variables above has a linear relationship between senior high school 10 Jambi City and senior high school 5 Jambi City. It is proven that the sig result is less than 0.05. Correlations test of cognitive development and disciplinary character is described in the following table:

Table 7. Correlation test of cognitive development and discipline character

Class	Variable	N	Sig.
Senior high school 10 Jambi City	Cognitive development	25	0.20
Senior high school 5 Jambi City	Discipline character	25	0.21

Based on the table above, it can be concluded that there is a relationship between cognitive development and disciplinary character of students in high school. It is proven by the results of sig. (2-tailed) is smaller than 0.05.

### Results of Interviews with Teachers

In interviews with teachers at senior high school 10 Jambi City and senior high school 5 Jambi City regarding the teacher's strategy for fostering students' cognitive development and students' disciplinary character. The teacher said that the students' cognitive development was good compared to before. For the character of student discipline, the teacher said that the character of student discipline was also good because many students had come to school on time and were doing the assignments given by the teacher. However, in the physics learning process the teacher said that there were some deficiencies in class senior high school 10 Jambi City and senior high school 5 Jambi City, namely the lack of facilities and infrastructure in schools.

The resulting data is processed using three types of tests, namely descriptive statistical tests, assumption tests, and hypothesis tests. Descriptive statistical test to see the results of the percentage, median, mean, minimum, and maximum by analyzing the result data based on several existing categories. Based on table 3, the average number of students chose the sufficient category with the percentage for senior high school 10 Jambi City 56% sufficient and senior high school 5 Jambi City 58% sufficient. Relationship Between Student ... (Fhadira Insani Putri, Elza Triani) pp:116-124

City 44% sufficient. So, it can be concluded that senior high school 10 Jambi City is superior to senior high school 5 Jambi City in cognitive development variables. Based on table 4, the average number of students chose the good category with the percentage for senior high school 10 Jambi City 44% good and senior high school 5 Jambi City 40% good. So, it can be concluded that senior high school 10 Jambi City is superior to senior high school 5 Jambi City in the disciplinary character variable.

The next test is the assumption test which consists of a normality test and a linearity test. Test the first assumption analysis about the normality test. The normality test was carried out to find out whether the data was normally distributed or not by looking at the Kolmogorov Smirnov results which were greater than 0.05 (Budiarti et al., 2022). Based on table 5, the results of the normality test for the character of discipline and students' understanding of concepts, namely at senior high school 10 Jambi City, namely 0.200 and at senior high school 5 Jambi City namely 0.200, it can be concluded that the results obtained are  $> 0.05$  so that it can be said that the data is normally distributed. Based on table 6, the results of the linearity test for the character of discipline and students' understanding of concepts, namely in senior high school 10 Jambi City, namely 0.015, in senior high school 5 Jambi City, namely 0.016, it can be concluded that the results obtained are  $> 0.05$  so that it can be said that the data is a linear distribution.

Furthermore, the hypothesis test is carried out, namely the correlation test. The correlation test was carried out with the aim of knowing the relationship between two classes in one school with the relationship between the two variables by looking at the Kolmogorov Smirnov results which are greater than 0.05 (Amin et al., 2021). Based on table 7, it was found that there was a relationship between cognitive development and students' disciplinary character in class X high school. It is proven by the results of sig. (2-tailed) is smaller than 0.05.

This research is in line with previous research conducted by (Lailah & Tenri, 2018), which examined cognitive development in student learning. In this study said that the cognitive development of students is very important for students to have. In line with this research because this research also says that students' cognitive development is also very important for students, especially students at the senior high school level. However, previous research did not carry out several tests as was done in this study. So this research is more accurate because it does three types of testing. This research is also in line with previous research conducted by (Ariyanto et al., 2018) regarding the problem solving learning model. In this study said that the problem-solving learning model. In line with this research because the problem-solving learning model applied by the teacher in learning for students is very important. However, previous research did not compare the two classes as was done in this study to see whether the problem-solving learning model was appropriately applied to students.

The short-term impact of this research is that it is useful for students, teachers and schools in improving the cognitive development of students in senior high schools for the better. The long-term impact of this research is that it can be used as a source or benchmark in making scientific articles and further research. The limitations of this study are only comparing one class in two schools. However, no comparison has been made for different schools in order to know the relationship between cognitive development variables and disciplinary character. Researchers suggest conducting further research to compare cognitive development and disciplinary character in two or more schools in order to know the relationship and comparison of the two variables.

## **CONCLUSION**

Based on the formulation of the problem in the research, it can be concluded that in senior high school 10 Jambi City has superior cognitive development and disciplinary character compared to senior high school 5 Jambi City. There is a relationship between cognitive development and the disciplinary character of students in high school in physics subjects.

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