



Generic Science Skills with Student Learning Perseverance in Junior High Schools in Science Learning

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ABSTRAK

Meskipun Ilmu Pengetahuan Alam (IPA) telah menjadi bagian integral dari kurikulum di tingkat SMP, terdapat sejumlah kesenjangan dalam praktik pembelajaran di lapangan yang perlu mendapat perhatian. Salah satu kesenjangan utama adalah terkait penerapan keterampilan generik sains dalam proses belajar-mengajar. Penelitian ini bertujuan untuk menginvestigasi hubungan dan pengaruh antara keterampilan generik sains dan ketekunan belajar siswa SMP dalam pembelajaran Ilmu Pengetahuan Alam. Penelitian ini termasuk dalam jenis penelitian kuantitatif yang menggunakan metode analisis statistik deskriptif dan inferensial dengan uji korelasi Pearson dan Regresi. Sampel penelitian terdiri dari 52 siswa kelas VII di jenjang SMP yang dipilih menggunakan teknik random sampling. Metode pengumpulan data yang digunakan adalah observasi dan kuesioner. Instrumen pengumpulan data meliputi lembar observasi dengan skala Likert 4 untuk keterampilan generik sains siswa dan angket dengan skala Likert 5 untuk ketekunan belajar siswa. Teknik analisis data dalam penelitian ini menggunakan pendekatan kuantitatif yang terdiri dari analisis statistik deskriptif dan inferensial. Temuan penelitian menunjukkan bahwa terdapat korelasi yang signifikan antara keterampilan generik sains dan ketekunan belajar siswa di kedua sekolah. Sehingga dapat disimpulkan bahwa, semakin tinggi keterampilan generik sains siswa, semakin tinggi pula tingkat ketekunan belajar mereka dalam pembelajaran IPA. Selain itu terdapat pengaruh keterampilan generik sains terhadap ketekunan belajar siswa. Implikasi dari penelitian ini sangat relevan untuk pengembangan pendidikan sains di tingkat sekolah menengah pertama.

ABSTRACT

Although Natural Science (IPA) has become an integral part of the curriculum at the junior high school level, there are several gaps in learning practices in the field that need attention. One of the main gaps is related to applying generic science skills in the teaching-learning process. This study investigates the relationship and influence between science generic skills and the perseverance of junior high school students in learning science. This study belongs to the quantitative research category that uses descriptive and inferential statistical analysis methods with Pearson correlation and Regression tests. The research sample consisted of 52 seventh-grade students at the junior high school level, selected using random sampling. The data collection methods used were observation and questionnaires. The data collection instruments included an observation sheet with a Likert scale of 4 for students' science generic skills and a questionnaire with a Likert scale 5 for students' learning perseverance. Data analysis techniques in this study used a quantitative approach consisting of descriptive and inferential statistical analysis. The findings showed a significant correlation between science generic skills and students' learning perseverance in both schools. So, it can be concluded that the higher the students' generic science skills, the higher the level of their perseverance in learning science. In addition, science generic skills influence students' learning perseverance. The implications of this study are very relevant for developing science education at the junior high school level.

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1. INTRODUCTION

The study of Natural Sciences at the junior high school level is an important part of the educational curriculum designed to develop students' scientific knowledge, skills, and attitudes (Astuti et al., 2024; Miah, 2022; Ocak et al., 2022). The subject of Natural Sciences includes various disciplines such as biology, physics, and chemistry, aiming to provide a basic understanding of natural phenomena and technology (Amakraw & Kartika, 2022; Madyan et al., 2024; Sulistia & Irasari, 2024). In learning Natural Sciences, students are expected to develop critical, analytical, and creative thinking skills that are essential in everyday life and in the future workforce (Hidayati et al., 2021; Kwangmuang et al., 2021). One crucial skill in learning Natural Sciences is generic science skills (Cham & Abd Rashid, 2022; Kamaruzaman et al., 2023; Martatiyana & Madani, 2023). These skills include students' abilities in observation, sense of scale, causality, logical framework, and logical inference (Pujani et al., 2022; Utami et al., 2023). Generic science skills help students to understand and explore scientific concepts more deeply, allowing them to connect theory with practice (Chan et al., 2017; Yohana et al., 2018). With these skills, students are not only able to master the subject matter but also develop a more holistic understanding of the scientific world.

The importance of generic science skills in learning Natural Sciences cannot be overlooked. These skills form the foundation for students to actively participate in the learning process and to develop higher-order thinking skills. By mastering generic science skills, students can identify problems, formulate hypotheses, and conduct experiments to find accurate solutions. These skills also encourage students to continually learn and adapt to the ever-changing advancements in science and technology. In addition to generic science skills, perseverance in learning also plays a crucial role in Natural Sciences education. Perseverance refers to the attitudes and behaviors of students that demonstrate dedication, resilience, and consistency in following the learning process (Agus et al., 2024; Ilma et al., 2021; Teimouri et al., 2022). Diligent students tend to be more capable of overcoming challenges and difficulties encountered during learning and are more enthusiastic about achieving their academic goals (Krismayoni & Suarni, 2020; Nuraini & Hakim, 2023; Suliman et al., 2021). Perseverance in learning is also closely related to intrinsic motivation, which is the internal drive of students to learn and grow (Alamri et al., 2020; Harahap et al., 2024; Pratama, 2024). Student perseverance has significant implications for their learning outcomes. Students who demonstrate high perseverance typically achieve better academic performance because they do not easily give up and continuously strive to understand the subject matter despite facing difficulties (Prastawa & Radiyanto, 2024; Yahyuni et al., 2023). Perseverance also helps students develop self-discipline and good time management, which are essential for success in studies and everyday life (Kinesti et al., 2021; Rahma, 2024). Although both generic science skills and student perseverance are important in learning Natural Sciences, there exists a research gap that needs further analysis. Previous research on generic science skills among junior high school students examined the comparison of students' generic science skills by applying different learning models. The results of that research indicated no differences in students' generic science skills with the application of different learning models (Noviandayati, 2021). Previous research on student perseverance by applying various learning models found differences in the influence of perseverance on students' cognitive learning outcomes (Ilma et al., 2021). Many studies have examined these two variables separately, but there has been little research on the relationship between generic science skills and student perseverance simultaneously. Investigating the correlation between these two variables can provide more comprehensive insights into the factors that influence students' learning success in Natural Sciences.

This study offers novelty by combining the analysis of generic science skills and student perseverance in the context of Natural Sciences education. The urgency of this research lies in the need to understand how generic science skills can affect student perseverance, thereby informing more effective teaching strategies. The aim of this study is to determine the relationship between generic science skills and student perseverance and to understand the impact of generic science skills on the perseverance of junior high school students in learning Natural Sciences. It is hoped that this research can contribute positively to the development of curriculum and teaching methods in schools.

2. METHOD

This study is a quantitative research that employs statistical analysis methods to examine the relationships and effects between the variables studied (Mohajan, 2020; Sari et al., 2022). In this research, Pearson correlation tests are used to determine whether there is a significant relationship between students' generic science skills and perseverance in learning (Baak et al., 2020; Nuriyatin & Agustina, 2022). Additionally, regression tests are applied to analyze the extent to which generic science skills influence students' perseverance. This quantitative approach allows researchers to objectively measure

and analyze data, providing valid and reliable results regarding the relationships and effects between the variables studied in the context of Natural Sciences learning in junior high school. The population in this study consists of all seventh-grade students at State Middle School 017 Jambi and State Middle School 019 Jambi. This population was chosen because seventh-grade students are at the initial stage of learning Natural Sciences at the junior high school level, making it crucial to understand how their generic science skills and perseverance in learning are formed and developed at this stage. By studying this population, researchers can obtain a representative picture of students' skills and perseverance in learning Natural Sciences, which can later be used to develop more effective teaching strategies that meet the needs of students at the early stages of secondary education.

The sample for this study was selected using random sampling techniques, which allow each seventh-grade student in both schools to have an equal chance of being chosen as a respondent (Effendi et al., 2020; Maidiana, 2021). This technique was chosen to ensure that the obtained sample truly represents the population, allowing the research results to be generalized with a high degree of confidence. In the sampling process, researchers will draw lots or use other random methods to determine which students will be included in the sample. The sample in this study consists of 52 seventh-grade students from both schools. The data collection methods used were questionnaires and observation. The data collection instrument to measure students' generic science skills in this study is an observation sheet with a 4-point Likert scale. This observation sheet is designed to record and assess various aspects of students' generic science skills during Natural Sciences learning. The 4-point Likert scale is used to evaluate each skill indicator, which includes 1 (very not good), 2 (not good), 3 (good), and 4 (very good). The indicators of generic science skills observed include observation ability, sense of scale, causality, logical framework, and logical inference. Each of these indicators will be assessed based on the frequency and quality of skills demonstrated by students in learning activities. The data collection instrument to measure students' perseverance is a questionnaire using a 5-point Likert scale. This questionnaire is designed to obtain information regarding the level of students' perseverance in following Natural Sciences learning. The 5-point Likert scale is used to rate students' responses to various statements reflecting learning perseverance, with response options of 1 (very not good), 2 (not good), 3 (enough), 4 (good), and 5 (very good). The indicators of perseverance measured include not procrastinating on task completion, always utilizing available opportunities, always wanting to try more challenging tasks, individual expectations of ability, working according to main priorities, and never being satisfied with achieved results. Each of these indicators will be evaluated based on students' responses to the statements in the questionnaire, providing a comprehensive picture of their perseverance in the context of Natural Sciences learning. The following is a grid of research instruments used in this research in Table 1 and Table 2.

Table 1. Research Instrument Grid

Variable	Indicator	Number of statement items
students' science generic skills	Observation sense of scale Causality logical frame logical inference	26
student learning persistence	Do not delay work completion time Always take advantage of existing opportunities Always wanting to try more challenging work Individual expectations of abilities Work according to top priority Never satisfied with the results obtained	28

Table 2. Variable Categories in Research with a Likert Scale

Variable	Interval	Category
students' science generic skills	26.0-45.5	Very not good
	45.6-65.0	Not good
	65.1-84.5	Good
	84.6-104.0	Very good
student learning persistence	28.0-50.4	Very not good
	50.5-72.8	Not good

Variable	Interval	Category
	72.9-95.2	Enough
	95.3-117.6	Good
	117.7-140.0	Very good

The data analysis technique in this research uses a quantitative approach consisting of descriptive and inferential statistical analysis (Aqillamaba & Puspaningtyas, 2022; Kamid, Mujahidawati, et al., 2022). Descriptive statistical analysis is used to describe the data obtained from measuring students' generic science skills and perseverance. Through this analysis, a general overview of data distribution will be obtained, such as the mean, median, and the percentage of certain categories within the sample. The results of descriptive statistics provide initial information regarding the spread and tendencies of the data collected from students at State Middle School 017 Jambi and State Middle School 019 Jambi. Subsequently, inferential statistical analysis is used to test the hypotheses formulated in this study, including correlation and regression tests (Aifu et al., 2024; Kamid, Kurniawan, et al., 2022; Perangin-Angin et al., 2023). Pearson correlation test is applied to determine whether there is a significant relationship between students' generic science skills and perseverance. Regression analysis is used to examine the extent to which generic science skills influence students' perseverance. Before hypothesis testing, assumption tests such as normality, homogeneity, and linearity tests are conducted to ensure that the data meet the required conditions for statistical analysis. Through this quantitative approach, the study can produce objective and reliable findings regarding the relationship between generic science skills and student perseverance and the influence of generic science skills on student perseverance in Natural Sciences learning at the junior high school level. The research procedure begins with the preparation stage, which includes the development of research instruments, namely observation sheets and questionnaires, followed by validity and reliability testing. Once the instruments are deemed valid and reliable, the researcher will perform random sampling from the population of seventh-grade students at State Middle School 017 Jambi and State Middle School 019 Jambi. The next stage is data collection, where the researcher observes students' generic science skills during Natural Sciences learning activities using a 4-point Likert scale observation sheet and collects data on students' perseverance through a 5-point Likert scale questionnaire. The collected data is then analyzed using descriptive and inferential statistics to determine the relationship between generic science skills and student perseverance and to assess the influence of generic science skills on student perseverance. The results of the data analysis will be interpreted and concluded.

3. RESULT AND DISCUSSION

Result

After data collection, the next step is data processing through descriptive statistical analysis of the generic science skills of students at State Middle School 017 Jambi and State Middle School 019 Jambi. The descriptive statistical results of the students' generic science skills are presented in Table 3.

Table 3. Descriptive Statistics Results of Students' Generic Science Skills

School	Interval	Category	F	%	Mean	Med	Min	Max
State Middle School 017 Jambi	26.0-45.5	Very not good	1	3.8	82.0	84.0	40.0	102.0
	45.6-65.0	Not good	2	7.7				
	65.1-84.5	Good	19	73.1				
	84.6-104.0	Very good	4	15.4				
State Middle School 019 Jambi	26.0-45.5	Very not good	0	0	84.0	84.0	60.0	104.0
	45.6-65.0	Not good	3	11.5				
	65.1-84.5	Good	17	65.4				
	84.6-104.0	Very good	6	23.1				

Based on the results of the descriptive statistical analysis, the generic science skills of students at State Middle School 017 Jambi were found to be in the good category, with a percentage of 73.1%. Similarly, the generic science skills of students at State Middle School 019 Jambi were also found to be in the good category, with a percentage of 65.4%. The descriptive statistical results of student perseverance are presented in Table 4.

Table 4. Descriptive Statistical Results of Student Learning Perseverance

School	Interval	Category	F	%	Mean	Med	Min	Max
State Middle School 017	28.0-50.4	Very not good	0	0	96.0	102.0	90.0	120.0
Jambi	50.5-72.8	Not good	0	0				
	72.9-95.2	Enough	5	19.2				
	95.3-117.6	Good	17	65.4				
	117.7-140.0	Very good	4	15.4				
State Middle School 019	28.0-50.4	Very not good	0	0	98.0	102.0	72.0	110.0
Jambi	50.5-72.8	Not good	1	3.8				
	72.9-95.2	Enough	6	23.1				
	95.3-117.6	Good	17	65.4				
	117.7-140.0	Very good	2	7.7				

Based on the results of the descriptive statistical analysis, the perseverance of students at State Middle School 017 Jambi was found to be in the good category, with a percentage of 65.4%. Similarly, the perseverance of students at State Middle School 019 Jambi was also found to be in the good category, with a percentage of 65.4%. After the descriptive statistical analysis, the next step is to perform inferential statistical analysis with hypothesis testing to determine whether there is a relationship between generic science skills and student perseverance, and to understand the influence of generic science skills on student perseverance. Before conducting the hypothesis tests, assumption tests are carried out to ensure that the data meets the requirements for correlation and regression analysis. The assumption tests conducted in this study include data normality tests, data homogeneity tests, and data linearity tests (Jessica Thio & Junaidi, 2024; Kamid et al., 2023; Usmadi, 2020). The normality test is conducted to ensure that the distribution of data on generic science skills and student perseverance follows a normal distribution. The homogeneity test is conducted to test the equality of variances between data groups. The linearity test is conducted to ensure that the relationship between generic science skills and perseverance is linear. The results of the normality test are shown in Table 5.

Table 5. Results of the Data Normality Test

Schools	Variable	Kolmogorov-Smirnov Sig.	Distributed
State Middle School 017	students' science generic skills	0.200	Normal
Jambi	student learning persistence	0.200	Normal
State Middle School 019	students' science generic skills	0.200	Normal
Jambi	student learning persistence	0.200	Normal

Based on the results of the normality test using the Kolmogorov-Smirnov technique as shown in Table 5, it can be stated that the data in this study is normally distributed. The test results indicate that the significance values for generic science skills and student perseverance are greater than 0.05, which means the data is normally distributed. Thus, the normality assumption is met, allowing the inferential statistical analysis to proceed. The results of the data homogeneity test are shown in Table 6.

Table 6. Homogeneity Test Results

Variable	School	Sig.	Distributed
students' science generic skills	State Middle School 017 Jambi	0.08	Homogen
	State Middle School 019 Jambi		
student learning persistence	State Middle School 017 Jambi	0.13	Homogen
	State Middle School 019 Jambi		

Based on the results of the homogeneity test using Levene's test, the significance values obtained are 0.08 for generic science skills and 0.13 for student perseverance. Since the significance values for both variables are greater than 0.05, it can be concluded that the variances between the data groups are homogeneous. This satisfies one of the basic assumptions necessary to proceed with the next inferential statistical analysis, such as regression analysis. The results of the research data linearity test are displayed in Table 7.

Table 7. Linearity Test Results

Variable	School	Sig.	Distributed
students' science generic skills*student learning persistence	State Middle School 017 Jambi	0.731	Linear
	State Middle School 019 Jambi	0.702	Linear

The results of the linearity test shown in Table 7 indicate that the significance value (Sig.) of Deviation From Linearity is greater than 0.05. This shows that there is no significant deviation from linearity, so it can be concluded that the relationship between generic science skills and student perseverance is significantly linear. Thus, the data meets the linearity assumption, which means that generic science skills and student perseverance have a relationship pattern that can be explained by a linear model. This provides a strong basis for proceeding with Pearson correlation analysis to further examine the relationship between these two variables. After conducting the assumption tests and ensuring that the data meets the requirements for normality, homogeneity, and linearity, the analysis can proceed with correlation and regression hypothesis testing. Pearson correlation is used to determine whether there is a significant relationship between generic science skills and student perseverance. Meanwhile, regression analysis is used to determine the influence of generic science skills on student perseverance. With the data meeting the basic assumptions, this correlation test will provide valid results regarding the strength and direction of the relationship between the two variables. The results of the correlation test will reveal whether there is a relationship between generic science skills and student perseverance, providing deeper insights into the factors influencing the success of Natural Sciences learning at the junior high school level. The results of the Pearson correlation test can be seen in Table 8.

Table 8. Results of the Correlation Test between Generic Science Skills and Student Perseverance

Schools		student learning persistence
State Middle School 017 Jambi	students' science generic skills	Sig.(2-tailed) N 0.002 26
State Middle School 019 Jambi	students' science generic skills	Sig.(2-tailed) N 0.000 26

Based on the correlation test results shown in Table 8, the significance value (Sig. (2-tailed)) between generic science skills and student perseverance at State Middle School 017 Jambi is 0.002, which is less than 0.05. This indicates that there is a significant correlation between generic science skills and student perseverance at this school. Similarly, the Sig. (2-tailed) value between generic science skills and student perseverance at State Middle School 019 Jambi is 0.000, which is also less than 0.05, indicating a significant correlation between these two variables at this school. These results suggest that at both State Middle School 017 Jambi and State Middle School 019 Jambi, the generic science skills possessed by students have a significant relationship with their level of perseverance in learning Natural Sciences. The next step is the regression test, which is used to determine the influence of generic science skills on student perseverance. This regression test allows researchers to understand how much generic science skills contribute to predicting or explaining variations in student perseverance. The regression test results are listed in Table 9.

Table 9. Results of the Regression Test of Generic Science Skills on Student Perseverance

School	Independent Variable	Sig.	R	R Square
State Middle School 017 Jambi	students' science generic skills	0.002	0.905	0.819
State Middle School 019 Jambi		0.021	0.871	0.759

Dependent variable: student learning persistence

The regression test results in Table 9 show that the significance value (Sig.) is 0.002 for the results at State Middle School 017 Jambi and 0.021 for the results at State Middle School 019 Jambi. Since the obtained significance values are smaller than the probability threshold of 0.05, it can be concluded that generic science skills have a significant influence on student perseverance. The coefficient of determination (R Square) from the regression test results is 0.819 for State Middle School 017 Jambi,

indicating that generic science skills influence student perseverance by 81.9%. Similarly, the coefficient of determination (R Square) is 0.759 for State Middle School 019 Jambi, indicating that generic science skills influence student perseverance by 75.9%.

Discussion

The generic science skills of students at both schools, State Middle School 017 Jambi and State Middle School 019 Jambi, are categorized as good. At State Middle School 017 Jambi, the percentage of students with good generic science skills is 73.1%. This indicates that the majority of students at this school are capable of observing, understanding scales, recognizing cause-and-effect relationships, using logical frameworks, and making logical inferences in science learning. Similarly, at State Middle School 019 Jambi, the students' generic science skills are also categorized as good, with a percentage of 65.4%. Although this percentage is slightly lower than that of State Middle School 017 Jambi, it still shows that the majority of students at this school have good abilities in applying generic science skills. The difference in percentages between the two schools may be due to variations in curriculum implementation, teaching quality, or student backgrounds. Overall, the high percentage of students with good generic science skills at both schools indicates that the science learning programs implemented are effective in developing these important skills. This result also emphasizes the importance of continually strengthening and enhancing teaching methods and providing supportive facilities to maintain and improve students' generic science skills (Adawiyah, 2021; Efendi & Sholeh, 2023).

The perseverance of students in learning at State Middle School 017 Jambi and State Middle School 019 Jambi is both categorized as good, with a percentage of 65.4%. This indicates that more than half of the students at both schools have a high level of perseverance in science learning. Good perseverance reflects the students' ability to avoid procrastination, seize available opportunities, always try more challenging tasks, have individual expectations of their capabilities, work according to primary priorities, and never be satisfied with their results in science learning activities. The similarity in percentages between the two schools suggests that there are common factors influencing student perseverance, such as effective teaching methods and a supportive learning environment (Sarbaitinil et al., 2024; Wardani et al., 2024). Overall, the high percentage of student perseverance in both schools is a positive indicator of the quality of education and the existing learning environment. It also shows that with the right support, students can develop attitudes and behaviors that contribute to their academic success. These results are important as a basis for maintaining and enhancing the efforts that have been made, as well as identifying and implementing new strategies to further increase student perseverance.

The correlation test results showing a significant correlation between generic science skills and student perseverance in learning at State Middle School 017 Jambi and State Middle School 019 Jambi provide important insights into the factors influencing student achievement in science learning. This significant correlation indicates that the higher the students' generic science skills, the higher their level of perseverance in learning. This can be interpreted as a mutual support between the ability to understand scientific concepts and the students' ability to remain diligent and focused on learning science material. In other words, students with good generic science skills tend to have a better ability to maintain their perseverance in tackling complex subjects like science (Mudana et al., 2023). The regression test results indicate that generic science skills have a significant impact on student perseverance in both schools studied, namely State Middle School 017 Jambi and State Middle School 019 Jambi. With a significance value of 0.002 at State Middle School 017 Jambi and 0.021 at State Middle School 019 Jambi, both of which are less than 0.05, it can be concluded that generic science skills statistically affect student perseverance. This result confirms that students' ability to understand and apply basic science concepts significantly contributes to their level of perseverance in learning. In other words, students who are more skilled in science tend to be more diligent and consistent in their study efforts, which is crucial for their academic success in science learning (Sembiring & Sutirna, 2024; Stephen et al., 2020).

Furthermore, the coefficient of determination (R Square) values of 0.819 at State Middle School 017 Jambi and 0.759 at State Middle School 019 Jambi indicate that generic science skills affect student perseverance by 81.9% and 75.9%, respectively. These figures show that most of the variation in student perseverance can be explained by variations in their generic science skills. This finding highlights the importance of developing generic science skills in the science curriculum. Developing learning programs that focus on enhancing generic science skills can be an effective strategy to increase student perseverance, which in turn can improve their learning outcomes. Thus, this study provides strong evidence to support the integration of generic science skills into pedagogical approaches in junior high schools. Additionally, these results have important implications for curriculum development and teaching strategies. The generic science skills learned in science education not only provide technical knowledge and skills but also significantly impact students' attitudes and behaviors toward learning. Therefore, it is

crucial to design teaching strategies that can integrate the development of generic science skills with the strengthening of student perseverance. This can be achieved through the use of active and collaborative learning methods, the implementation of tasks that require critical and analytical thinking, and the provision of constructive feedback to enhance students' motivation and perseverance in science learning.

This research makes a significant contribution in deepening understanding of the factors that influence student learning achievement in science, thereby providing a strong foundation for the development of learning strategies that are more effective and responsive to student needs at the junior high school level. This research provides a new contribution to the understanding of the factors that influence student learning performance in science subjects, with the potential to provide more targeted recommendations for the development of learning strategies that are more effective and responsive to student needs at the junior high school level. The advantage of the solution proposed in this research is its ability to holistically and integrately identify and address various factors that influence student learning achievement in the field of science including generic science skills and student learning persistence. With a comprehensive approach, this solution not only focuses on cognitive aspects but also considers social, emotional and environmental factors that play an important role in the learning process. Additionally, the solution is designed to be flexible and adaptive, enabling the implementation of learning strategies tailored to individual student needs. This allows teachers to develop more effective and personalized teaching methods, thereby increasing students' overall learning motivation and academic performance.

The implications of this research are highly relevant for the development of science education at the junior high school level. The finding that students' generic science skills have a significant correlation with their level of perseverance signals a strong message for education policymakers and practitioners to integrate the development of generic science skills into the science curriculum. This can be achieved by designing more contextual learning experiences, emphasizing the use of active learning methods that build generic science skills while also fostering student perseverance. Moreover, these results also highlight the need for a holistic approach in science education that not only focuses on the cognitive aspect (generic science skills) but also addresses the affective aspect (student perseverance). These implications are also relevant for teachers and educators to design learning strategies that motivate students to stay focused and persistent in understanding complex scientific concepts, thereby improving the overall quality of student learning and outcomes. One limitation of this research is the use of a limited sampling method restricted to two schools in Jambi, therefore generalizing the results of this research to the junior high school student population in general needs to be done carefully. Additionally, the use of self-reporting measurement instruments for generic science skills and student perseverance through observation sheets and questionnaires may introduce subjective bias and affect the accuracy of the results. For future research, it is recommended to broaden the sample scope by collecting data from more schools and different geographical areas. Furthermore, using more objective and comprehensive measurement methods, such as direct tests or independent researcher observations, can enhance the validity and reliability of the research results. Recommendations for further research include conducting longitudinal studies to gain a deeper understanding of changes and developments in students' generic science skills and perseverance over time. Additionally, research that expands the variables of generic science skills and student perseverance, as well as integrates other factors influencing science learning in schools, can provide a more holistic understanding. It is also suggested to adopt more objective measurement methods and implement stronger research designs, such as experimental or cohort designs, to strengthen findings on the relationship between generic science skills and student perseverance.

4. CONCLUSION

Based on the results of this study, it can be concluded that there is a significant correlation between generic science skills and students' perseverance in learning at State Middle School 017 Jambi and State Middle School 019 Jambi. High levels of generic science skills are positively related to students' level of perseverance in learning IPA, indicating the importance of developing generic science skills to improve students' perseverance in learning. Furthermore, there is a significant influence of generic science skills on students' perseverance. Recommendations for future research include expanding the sample size and using more objective measurement methods to confirm the findings of this study more broadly. Additionally, longitudinal studies can provide deeper insights into the changes and development of generic science skills and students' perseverance in learning over time, thus making a more substantial contribution to the development of science education at the junior high school level.

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