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Research Article

The Influence of Intelligence Quotient and Study Habits on the Academic Achievement of Elementary School Students

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Abstract: Elementary school students' academic achievement remains a significant concern in Indonesia. The 2022 Computer-Based National Assessment indicated that many elementary school students in West Java had not yet achieved minimum competency standards in literacy and numeracy. Academic achievement is influenced by various internal factors, including cognitive ability, represented by Intelligence Quotient (IQ), and non-cognitive factors such as study habits. Although both variables have been widely examined in Western and East Asian contexts, studies investigating their simultaneous influence among Indonesian elementary school students, particularly in Cirebon City, remain limited. This study aimed to analyze the simultaneous effects of IQ and study habits on the academic achievement of students in Grades IV–VI in Cirebon City. A quantitative approach with an explanatory survey design was employed. The participants were 240 students aged 9–13 years, selected through proportionate stratified random sampling. IQ was measured using the Culture Fair Intelligence Test, while study habits were assessed using a validated questionnaire. The data were analyzed using multiple regression. The results showed that IQ ($\beta = 0.485$, $p < 0.001$) and study habits ($\beta = 0.151$, $p = 0.008$) had significant partial effects on academic achievement. Simultaneously, both variables explained 24.7% of the variance in academic achievement ($R^2 = 0.247$, $F = 38.901$, $p < 0.001$). IQ was the stronger predictor. These findings highlight the importance of strengthening both students' cognitive abilities and study habits to improve academic achievement in elementary education.

Keywords: intelligence quotient, study habits, academic achievement, elementary school, multiple regression analysis.

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INTRODUCTION

Academic achievement is the main indicator of the success of the formal education process which reflects the extent to which students master the competencies set out in the curriculum (Steinmayr et al., 2019). Academic achievement does not stand alone, but is influenced by a set of cognitive and non-cognitive factors that work synergistically in students. One of the most studied cognitive factors is intelligence quotient (IQ), which is a measure of an individual's general cognitive ability that includes abstract thinking capacity, logical reasoning, and adaptation to new situations (Lozano-blasco et al., 2022). IQ is a relatively stable and cross-contextual construct, so it is often used as a benchmark for predicting long-term academic success. On the other hand, study habits or learning habits refer to patterns of learning behavior that are systematic and consistent, including attitudes towards learning, timing, learning environment conditions, mastery of learning techniques, and management of assignments and exams (Álvarez & Fernández, 2015). Academic achievement is understood as measurable learning outcomes obtained by students through a series of formal evaluations and reflected in report card scores (Roth et al., 2015). These three variables IQ, study habits, and academic achievement are interrelated and are the focus of studies in an effort to optimize the quality of basic education.

The problem of low academic achievement of elementary school students is a serious issue in Indonesia. Data from the 2022 Computer-Based National Assessment (ANBK) shows that a large proportion of elementary school students in West Java are still in the category of minimum competencies in literacy and numeracy, which directly reflects academic achievement that is not optimal (Kemendikbudristek, 2023). This problem is not only individual, but also has an impact on the quality of basic education graduates. In the context of IQ, the findings of several studies show that students with cognitive capacity that have not yet reached the standard tend to have difficulty processing new information, which is ultimately reflected in the achievement of sub-optimal grades (Ali & Alvionita, 2024; Sugiarto, 2023). Meanwhile, with regard to study habits, the problem is that many elementary school students do not have structured learning habits, characterized by a lack of study time planning, lack of effective use of learning techniques, and reliance on studying before exams alone (Jannah et al., 2021; Nurfadila et al., 2021). This condition can be due to the lack of systematic steps from teachers in forming productive learning habits outside of school hours (Abid et al., 2023; Luvi, 2023). The urgency of increasing these two variables is becoming increasingly clear considering that both play a role as predictors that can be anticipated and especially for study habits can be intervened through planned educational programs.

A number of previous studies have provided a strong empirical basis for the relationship between IQ, study habits, and academic achievement. Alejandro et al., (2021) in a two-year longitudinal study in Spanish primary schools found that IQ and study habits together were able to predict 56–59% of the variance in academic achievement of grade III and IV students, with these two variables as significant predictors. Lozano-blasco et al., (2022), through a systematic review and meta-analysis of 27 studies, found that the correlation between intelligence and academic performance was r = 0.37, and confirmed that general intelligence remains the strongest predictor of academic achievement across educational levels. Abid et al., (2023) demonstrated that study habits and learning skills had a significant and fairly strong positive correlation (r = 0.721) with students' academic achievement at the secondary level, confirming the importance of learning habits as a non-cognitive predictor. Roth et al., (2015), through a large-scale meta-analysis, reported that the correlation between intelligence and academic achievement was ρ = 0.45 at the elementary school level, with an increasing trend at higher grade levels. Veas et al., (2015) demonstrated that the combination of cognitive (IQ) and non-cognitive (learning strategies) variables resulted in a predictive model of academic achievement with an accuracy of up to 61% in students aged 11–15 years, confirming the added value of integrating these two dimensions in a single prediction model.

However, there is a significant gap in the existing literature. These studies are mostly conducted in the context of Western, Middle Eastern, or East Asian cultures, while similar studies in the context of elementary schools in Indonesia, especially in Cirebon City, are still very limited. Local research available, such as Rahmawati & Muhroji, (2022) and Sunarso & Atmojo, (2022), generally examine only one of the variables (IQ or study habits) separately, without constructing an integrative prediction model that combines the two simultaneously in a single multiple regression design. In addition, there has been no research that specifically uses the study habits adapted and validated for the context of elementary school students in Indonesia using SmartPLS-based structural analysis. This gap is the starting point of this research.It is important to emphasize that the novelty of this study does not rest merely on the scarcity of similar studies in the Indonesian context, but on three substantive contributions. First, this study was conducted among elementary school students in Cirebon City, a setting with local social characteristics, learning culture, and basic education conditions that differ from the Western, Middle Eastern, and East Asian contexts in which most prior IQ–study habits research has been conducted.

Cirebon City, as part of the West Java region identified in the 2022 ANBK results as having a large proportion of elementary school students in the minimum-competency category, represents a basic-education setting with distinct local learning support conditions, making it a relevant yet underrepresented site for this line of research, so that the findings provide empirical evidence from a context that has been largely absent from the literature. Second, the principal contribution of this study lies not in examining IQ or study habits in isolation, but in developing an integrated predictive model that estimates the simultaneous and relative contribution of a cognitive factor and a non-cognitive factor within a single regression framework, which allows the relative weight of each factor to be directly compared. Third, this study carries practical implications that distinguish the two predictors by their modifiability: IQ is a relatively stable construct that is difficult to change through short-term intervention, whereas study habits represent a malleable factor that can be systematically developed through school-based programs; this distinction provides a more realistic basis for education policy, which should prioritize intervention on the factor that is actually amenable to change. This positioning is further supported by recent literature on self-regulated learning, which frames study habits as a manifestation of students' capacity to

regulate their own cognitive and behavioral engagement in learning (Panadero, 2017; Est et al., 2021), as well as by more recent evidence on the role of executive function and family or environmental (socioeconomic) factors as predictors of children's academic achievement (Tuero et al., 2022; Poon et al., 2022).

This research has a dual urgency. Theoretically, this study enriches the treasures of basic education with a model of predicting academic achievement built based on local empirical data in the Indonesian context. Practically, the findings of this study can be an evidence-based foundation for teachers, principals, and education policy makers in Cirebon City to design more targeted interventions. Given that study habits are variables that can be formed through habituation and guidance of teachers from an early age, understanding the amount of their contribution to academic achievement has high practical relevance in efforts to improve the quality of basic education. This study aims to analyze the influence of IQ and study habits simultaneously on the academic achievement of students in grades IV–VI of elementary school in Cirebon City. The proposed research hypotheses are:
(H1) IQ has a significant partial effect on students' academic achievement.
(H2) Study habits have a partial significant effect on students' academic achievement.
(H3) IQ and study habits simultaneously have a significant effect on students' academic achievement.

THEORETICAL FRAMEWORK

Intelligence Quotient (IQ) is a standard measure of a person's general intelligence obtained through a series of standardized psychometric tests, developed to quantify factors g Breit et al., (2024) that is, the general cognitive abilities that underlie a wide range of mental performance across domains. In the context of this study, IQ functions as a relatively stable cognitive predictor variable and reflects students' basic capacity to process information, think logically, and understand abstract concepts (Lozano-blasco et al., 2022). The IQ construct is relevant to this research topic because intellectual intelligence is a cognitive prerequisite that determines how quickly and accurately a student can assimilate new knowledge, thus directly affecting his or her academic achievement. Deary et al., (2007) affirming that general intelligence is the strongest predictor of academic achievement compared to other psychological variables, with a consistent predictive coefficient across cultures and educational levels; This proposition is reinforced by Lozano-blasco et al., (2022) Which through meta-analysis found that general and implicit intelligence emerged as the factor with the highest significance in explaining the variation in students' academic achievement.

Study habits are defined as the overall pattern of learning habits and techniques that are consistently applied by students in their daily learning activities, including general attitudes towards learning, the conditions of the place and the physical place of study, time planning, study techniques, and how to face exams and do assignments (Álvarez & Fernández, 2015). Within the framework of theory self-regulated learning developed by Baker, (2017), study habits are a manifestation of the ability of students to regulate their cognitive, motivational, and learning behavior aspects independently. This variable plays an important role in this study as a non-cognitive predictor that can be modified through pedagogical interventions, so it has high practical value. Credé and Kuncel (2008) demonstrated through meta-analysis that study habits are able to predict academic achievement independently of cognitive ability, while Abid et al., (2023) reinforced these findings by demonstrating a significant positive correlation between learning skills and academic achievement at the secondary

education level, which means that students with moderate IQ can achieve high academic achievement if they have structured learning habits.

Academic achievement refers to the level of competency mastery achieved by students as reflected in the results of formal evaluations, in this case the average report card score obtained from the accumulation of daily assessments, assignments, and semester exams (Roth et al., 2015). In this study, academic achievement acts as a dependent variable that is the final result of the interaction between cognitive factors (IQ) and behavioral factors (study habits). Academic achievement is multidimensional because it not only reflects the cognitive capacity of students, but also describes the consistency of learning behavior and the quality of the learning process experienced. The use of report card scores as an indicator of academic achievement has high ecological validity because it is a real measure used in the Indonesian formal education system covering various core subjects and is obtained through a series of evaluations carried out by teachers throughout the school year so that it is contextually relevant and representative to students' abilities as a whole.

METHODS

Research Design

This study used a quantitative approach based on an explanatory survey design (Jhon, W, 2014). This design was chosen because the study aimed to statistically examine the relationship and predictive contribution of the independent variables (IQ and study habits) and the dependent variable (academic achievement) based on numerical data collected from a large sample. Explanatory surveys allow researchers to statistically test hypotheses and generate generalizations of findings to a wider population. The use of Multiple Regression Analysis (MRA) as the analysis technique is in line with this design, as MRA is able to identify the unique contribution of each predictor simultaneously in a single regression model (Field, 2018).

Samples

The sample in this study consisted of 240 students from the upper grades (IV, V, and VI), aged between 9 and 13 years, in Cirebon City, West Java. The sampling technique used was proportionate stratified random sampling, which is a technique that divides the population into strata (classes IV, V, and VI) and then takes proportional random samples from each strata (Cohen et al., 2018). This technique was chosen because it can ensure the representativeness of each class level in the research sample, while also meeting the principle of randomization that reinforces the external validity of the findings. Based on the Slovin formula with a margin of error of 5%, the number of samples in the final analysis amounted to 240 students. Of the total sample, 124 students (51.66%) were male and 116 students (48.33%) were female. Further details are as follows: Class IV consisted of 83 students (34.58%), Class V consisted of 57 students (23.75%), and Class VI consisted of 100 students (41.67%).

Instruments and Data Collection

Data collection in this study was carried out in several stages. The first stage involved obtaining IQ test results by administering the Culture Fair Intelligence Test (CFIT), which consists of 4 subtests. The administration time for each subtest was limited: Subtest 1 had a maximum duration of 3 minutes, Subtest 2 of 2 minutes 30 seconds, Subtest 3 of 2 minutes 30 seconds, and Subtest 4 of 2 minutes. The questions in the IQ test are presented in the form of picture patterns (nonverbal).

In the second stage, data collection was carried out by disseminating study habits questionnaires to 240 students. A validity test was then conducted on the 56 items in the questionnaire, in which each "Yes" response was scored 1 and each "No" response was scored 0. Further details are presented in Table 1, the Study Habits Instrument Grid.

Table 1. Study Habits Instrument Grid

No	Aspects	Description	Positive Points	Negative Butir	Quantity
1	General Attitudes Towards Learning	Students' attitudes, interests, and motivation towards learning	1,8,10,19,33,34,36,42 ,46,52	-	10
2	Where to Study	Physical conditions and learning environment	9,25,29,35,38,44,45	2,16,43	10
3	Student Physical Condition	Physical conditions that affect learning readiness	3.11	15,18,40,5 3	6
4	Study Plan	Student study planning and scheduling	4,24,26,27,28,30,37, 41,49,54	-	10
5	Learning Techniques	Ways and steps of students in understanding lessons	5,6,7,12,13,14,21	17.39	9
6	Tests and Exercises	How students work on questions, tests, and exercises	7,23,24	32.55	5
7	Duties	How students work on assignments from searching to presenting	20,22,30,31,56	50	6
	Total		44	12	56

The question items in the Study Habits questionnaire are taken from the Questionnaire de Hábitos y Técnicas de Estudio (CHTE) reference by Álvarez and Fernández (2015), which has been translated and adapted to the context of Indonesian elementary school students. Academic achievement data was obtained from the average odd-semester report card scores covering all subjects, with a score range from 0-100.

Instrument Validity and Reliability Tests

The validity and reliability of the study habits instrument were tested using SmartPLS 3 (Ringle et al., 2015) through component-based structural equation modeling. The results of the construct validity test showed the value of Average Variance Extracted (AVE) in the main dimensions were above 0.50, namely: Learning Plan (AVE = 0.519), General Attitude Towards Learning (AVE = 0.653), Learning Techniques (AVE = 0.552), Place of Study (AVE = 0.570), and Assignment (AVE = 0.702), which indicates the fulfillment of convergent validity (Hair, 2019). The results of the reliability test showed the value of Composite Reliability (CR) ranges from

0.726 to 0.825, which meets a minimum threshold of 0.70 (Hair, 2019). The discriminant validity using the Fornell-Larcker criterion shows that the square root value of each construct is greater than the inter-construct correlation, confirming that each dimension measures conceptually different aspects. Overall, the instrument was declared valid and reliable for measuring study habits among elementary school students in Cirebon City. It should be noted that the Cronbach's Alpha values for several dimensions (ranging from 0.246 to 0.594) are relatively low compared to the conventional threshold of 0.70.

This is expected given that each dimension is measured with a small number of dichotomous (yes/no) items with heterogeneous loadings, a condition under which Cronbach's Alpha tends to underestimate true reliability because it assumes tau-equivalence among items. For this reason, Composite Reliability (CR) was used as the primary reliability criterion in this study, as CR does not assume equal item loadings and is considered more appropriate for reflective constructs estimated through PLS-SEM (Hair, 2019). All CR values exceeded the 0.70 threshold, supporting the internal consistency of the instrument despite the lower Alpha values. Regarding the IQ instrument, the Culture Fair Intelligence Test (CFIT) used in this study is a standardized, non-verbal, and culturally reduced psychometric instrument whose validity and reliability have been established in prior psychometric studies, including in the Indonesian context, where the CFIT Scale 2 has demonstrated good internal consistency (Cronbach's α = 0.88) and acceptable construct validity (Zahra & Ridfah, 2022); as such, no additional validation procedure was performed on the CFIT in this study, and its scores were used directly following the standard administration and scoring manual.

Table 2. Construct Validity and Realibility Test Result (SmartPLS 3.0).

Dimensions	Cron. α	pA	CR	AVE	Ket.
Study Plan	0.538	0.544	0.764	0.519	Valid & Reliable
General Attitudes Towards Learning	0.469	0.475	0.790	0.653	Valid & Reliable
Learning Techniques	0.594	0.595	0.787	0.552	Valid & Reliable
Where to Study	0.246	0.246	0.726	0.570	Valid & Reliable
Duties	0.578	0.587	0.825	0.702	Valid & Reliable

Note: α = Cronbach's Alpha; ρA = Dijkstra-Henseler's rho; CR = Composite Reliability; AVE = Average Variance Extracted. CR is used as the main reliability criterion (Hair, 2019). The validity of the discriminator is fulfilled based on the Fornell-Larcker criteria.

Data Analysis Techniques

Data analysis was carried out using Multiple Regression Analysis (MRA) with the Enter method through SPSS version 25 (IBM Corp., 2017). MRA was chosen because it was able to identify the contribution of each predictor (IQ and study habits) simultaneously to dependent variables (academic achievement), as well as controlling the influence of other variables in the model (Field, 2018). Before the regression analysis, classical assumptions were tested which included: (1) residual normality using P-P Plot graphs, (2) homogeneity through residual scatterplots, and (3) multicollinearity by examining the value of Variance Inflation Factor (VIF). The significance level used was α = 0.05.

RESULT

Descriptive Statistics

Table 3 presents the descriptive statistics of the three research variables obtained from 240 respondents of students in grades IV–VI of elementary school in Cirebon City.

Table 3. Descriptive Statistics of Research Variables (N = 240)

Variable	Mean	Std. Deviation
Academic Achievement	86.89	3.888
IQ	101.51	16.868
Study Habits	63.01	17.208

The average student IQ of 101.51 indicates that the sample as a whole is in the category of average intelligence (normative IQ score of 90–110). The average study habits of 63.01 shows quite good study habits, and there is still room for improvement. The average academic achievement of 86.89 (scale 0–100) indicates that most students are in the good category in achieving their learning outcomes.

Correlation Test

Before the regression analysis was carried out, the correlation between variables was first tested using Pearson correlation. The results of the correlation analysis are presented in Table 4.

Table 4. Correlation Matrix Between Research Variables

Variable	Academic Achievement	IQ	Study Habits
Academic Achievement	1.000	0.474	0.116
IQ	0.474	1.000	-0.072
Study Habits	0.116	-0.072	1.000

Description: $p < 0.001$; $p < 0.05$

The results showed that IQ had a significant and quite strong relationship with academic achievement ($r = 0.474$; $p < 0.001$), while study habits had a significant but less optimal relationship with academic achievement ($r = 0.116$; $p = 0.036$). IQ and study habits showed no significant correlation with each other ($r = -0.072$; $p = 0.132$), indicating that the two predictors were relatively independent.

Multiple Regression Analysis (MRA) Results

Multiple regression analysis was conducted to test the influence of IQ and study habits simultaneously on academic achievement. The classic assumption has been met: the P-P Plot graph shows a residual distribution close to normal, the scatterplot confirms homocedasticity, and the VIF values for IQ (1.005) and study habits (1.005) are well below the 10 threshold, indicating no multicollinearity. The results of the summary model and regression coefficients are presented in Table 5 and Table 6.

Table 5. Regression Model Summary

Model	R	R^2	Adjusted R^2	Std. Error	F	Sig.
1	0.497	0.247	0.241	3.387	38.901	< 0.001

Table 6. Regression Coefficients of Predictor Variables

Variable	B	Std. Error	Beta (b)	t	Sig.	Tolerance	VIF
(Constant)	73.397	1.611	–	45.548	< 0.001	–	–
IQ	0.112	0.013	0.485	8.577	< 0.001	0.995	1.005
Study Habits	0.034	0.013	0.151	2.675	0.008	0.995	1.005

The regression model produced had a value of $R^2 = 0.247$, which means that IQ and study habits together explained the 24.7% variance in students' academic achievement ($F (2.237) = 38.901$; $p < 0.001$). The Adjusted R^2 value = 0.241 confirms that the model is stable enough for generalization. Partially, IQ had a positive and significant effect on academic achievement ($\beta = 0.485$; $t = 8.577$; $p < 0.001$). Study habits also had a positive and significant effect on academic achievement ($\beta = 0.151$; $t = 2.675$; $p = 0.008$), although the contribution was smaller than IQ. Thus, all three research hypotheses (H1, H2, and H3) are accepted.

DISCUSSION

The first findings of this study confirm that IQ is the dominant predictor of academic achievement of elementary school students in Cirebon City, with a standardized beta coefficient of 0.485. These results are in line with the meta-analysis by Roth et al., (2015) that reported a correlation of IQ with academic achievement of $\rho = 0.45$ at the elementary school level, and was consistent with the study by Alejandro et al., (2021), which established IQ as the main significant predictor of academic achievement in a two-year longitudinal design. These findings are also in line with the systematic review and meta-analysis by Lozano-blasco et al., (2022), which demonstrated that general and implicit intelligence is the factor with the highest predictive power on students' academic performance. The greater predictive power of IQ compared to study habits can be explained through a neuropsychological perspective: higher general cognitive capacity allows students to process and integrate new information more efficiently, smoothing the process of assimilation of knowledge across subjects, thus having a direct impact on the acquisition of better grades (Deary et al., 2007). This relationship is further strengthened by studies Ali & Alvionita, (2024) which found a positive relationship between intellectual intelligence and student learning outcomes at various levels of education, including elementary school.

The second finding shows that study habits had a positive and significant effect on academic achievement ($\beta = 0.151$; $p = 0.008$), albeit with a smaller contribution than IQ. These results are consistent with the argument of Credé and Kuncel (2008) that study habits is a non-cognitive variable that is independent of intellectual ability, but still contributes significantly to academic performance. These results are also in line with Abid et al., (2023), which demonstrated a significant positive correlation between learning skills and academic achievement ($r = 0.721$), consistent with the findings of Richardson et al., (2012), which confirmed that learning strategies are among the strongest non-cognitive predictors, and is further strengthened by a number of national studies that have found a significant positive influence of learning habits on the learning outcomes of elementary school students (Luvi, 2023; Tamala et al., 2022; Yuliana & Rachman, 2022). The implication is that even students with moderate cognitive capacity can optimize their academic achievements through the formation of more structured and consistent learning habits ranging from time planning, mastery of active learning techniques, to the preparation of conducive learning environment conditions.

The combined contribution of IQ and study habits, 24.7% ($R^2 = 0.247$), indicates that these two variables are meaningful predictors, although 75.3% of the variance in academic achievement is still explained by other factors. This strengthens the perspective of Steinmayr et al., (2019) that academic achievement is multifactorial, where factors such as intrinsic motivation, teaching quality, family support, and socioeconomic conditions also play a significant role (Est et al., 2021;Hartanto & Sukartono, 2022). In addition, Duckworth & Seligman, (2005) suggests that self-discipline can even surpass IQ in predicting adolescent academic achievement, underscoring the importance of non-cognitive variables. The smaller R^2 value in this study compared to that of the study by Alejandro et al., (2021), which reached 56–59%, was likely due to the exclusion of short-term memory variables as well as differences in cultural context, curriculum characteristics, and measurement instruments used. Although the contribution of 24.7% may appear modest in absolute terms, it should not be read as indicating that IQ and study habits are unimportant. In social and behavioral research, where academic achievement is shaped by a wide array of interacting factors, an R^2 in this range reflects a moderate and practically meaningful contribution rather than a negligible one, especially given that only two predictors were modeled.

The remaining 75.3% of unexplained variance is consistent with the well-established multifactorial nature of academic achievement and does not diminish the practical value of the two predictors examined here, particularly because both are measurable and, in the case of study habits, directly actionable through school-based intervention. Compared with studies reporting substantially higher R^2 values, such as Alejandro et al. (2021), the more modest explanatory power found in this study may also reflect the narrower set of predictors modeled (excluding, for example, short-term memory, motivation, or family support) rather than a weaker underlying relationship between the variables themselves. Future studies that incorporate additional cognitive and non-cognitive predictors within the same model are needed to determine whether the explanatory power can be meaningfully improved without compromising model parsimony.

Overall, the findings of this study have important practical implications for the world of basic education in Cirebon City. First, although IQ is relatively stable and difficult to intervene directly, schools can design learning programs that differentiate according to students' cognitive capacity so that each child can develop their potential optimally. Second, considering that study habits are variables that can be formed through habituation, a systematic learning habit development program needs to be implemented from the beginning of elementary school. Teachers have a key role to play in internalizing productive learning habits through modeling, structured guidance, and ongoing feedback. More specifically, because the study habits instrument used in this study captures seven interrelated dimensions (general attitude toward learning, place of study, physical condition, study planning, learning techniques, exams/exercises, and assignments), the recommended intervention can be designed to target each dimension directly rather than treating study habits as a single, undifferentiated construct.

For the study planning dimension, schools can implement structured time-management coaching, such as guided weekly study planners and simple goal-setting exercises delivered during homeroom or guidance sessions. For the learning techniques dimension, teachers can provide explicit strategy training (e.g., note-taking, summarization, and self-testing techniques); this approach has been shown to significantly improve strategy use and academic performance among upper elementary school students in randomized intervention studies (Dermitzaki, 2025; (Tuero et al., 2022). For the place-of-study dimension,

since this aspect largely lies outside teachers' direct control, schools can conduct brief workshops or provide take-home guides for parents on creating a conducive home study environment. For the assignment dimension, structured homework-completion support, such as supervised study halls or peer-assisted assignment sessions, can help students build more consistent work habits. Embedding these targeted components within a single, ongoing school program, rather than a one-off workshop, is likely to be more effective, given that study habits are formed through sustained practice rather than a single intervention. The limitations of this study include the use of IQ data from various sources that may use different instruments, as well as the exclusion of moderator or mediator variables such as learning motivation, self-efficacy, and family support that have the potential to affect the relationship between predictors and academic achievement. In addition, as this study employed a cross-sectional survey design, the relationships identified between IQ, study habits, and academic achievement are correlational and predictive in nature, and should not be interpreted as evidence of a causal relationship. Longitudinal or experimental designs are required in future research to establish the direction and causal mechanisms underlying these relationships.

CONCLUSION

This study succeeded in proving that IQ and study habits simultaneously had a significant effect on the academic achievement of students in grades IV–VI of elementary school in Cirebon City, with a contribution of 24.7% ($R^2 = 0.247$; $F = 38{,}901$; $p < 0.001$). Partially, IQ was the dominant predictor ($\beta = 0.485$; $p < 0.001$) compared to study habits ($\beta = 0.151$; $p = 0.008$), but both had a real and significant influence. All three research hypotheses are accepted. These findings confirm that although IQ is a cognitive factor with greater predictive power, study habits as a non-cognitive variable still have a significant and non-negligible role in shaping students' academic achievement. Efforts to improve the quality of basic education should ideally focus not only on cognitive stimulation, but also on the formation of structured and sustainable learning habits from an early age. Further research is recommended to include mediator variables such as learning motivation, self-efficacy, or parental support using uniformly standardized IQ instruments and to expand the scope of the sample to a more diverse region to improve the generalizability of the findings.

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