

Examining the Effectiveness of Education Policy: A Case of Educational Assistance in Bintan Regency, Kepulauan Riau

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Abstract. This study aims to examine the effect of education assistance policies on education quality. A quantitative approach using a regression model was used. Education assistance budget data was obtained from Bintan Regency for 2014–2025. Data on education quality indicators were obtained from the Bintan Regency Central Statistics Agency. The analysis was conducted using multiple linear regression across two models: Model 1 for the elementary school level and Model 2 for the junior high school level. The results showed that the amount of education assistance allocation had a significant effect on education development but did not have a substantial impact on literacy rates, gross enrollment rates, or net enrollment rates. At the junior high school level, the regression model was not significant, and no variables were found to be partially significant. The results showed that education aid only improved the quality of education at the primary school level. This study underlines the important role of evaluating education aid programs to improve the quality of education over effectively.

Keywords: Educational Assistance, Educational Quality, Regression, Educational Development.

1 Introduction

Educational assistance has played a strategic role in improving learning outcomes. The tangible benefits of the aid distribution system reach key target groups such as students, schools, and parents, while addressing the demand and supply challenges of education. Various programs, such as scholarships for low-income families and school-supply subsidies, have been shown to encourage greater educational participation by reducing families' financial burden [1], [2], [3]. In addition, the education sector is also an essential component of various conditional cash transfer programs that aim to improve health and education quality, such as the *Bolsa Familia* program in Brazil, the Family Hope Program in Indonesia, and *Oportunidades* in Mexico [4].

Theoretically, elementary education is free and does not require additional fees for students. However, routine financing for secondary and higher education is still the responsibility of families through school fees, which are then paid to the state and reallocated to schools through the education support fund mechanism. In practice, each educational institution is required to manage its admission and financial processes independently [5].

Technically, the government has primary responsibility for funding education. However, the costs of providing community-managed education are still considered the responsibility of the educational institutions concerned. In some countries, government funding only covers certain parts of compulsory schooling. Education programs are funded by the state's annual budget and a special education development budget. There is also funding from international assistance in the form of loans and grants, as well as contributions from local governments and the private sector [5].

Previous studies have shown that various forms of education interventions, such as increasing school enrollment, building new schools, supporting infrastructure, and conditional cash transfer programs, as well as providing school meals, have a positive impact on education quality and access [6], [7]. There are other programs in place to improve learning outcomes such as merit-based scholarships, strengthening school management, and providing educational information to parents. However, there is not enough evidence available to show consistency in their impact [7], [8].

Overall, these programs are intended to expand access, be able to increase participation and ensure the sustainability of education for all levels of society, especially children from low-income families. Although there have been some studies, such as the research conducted by Hadna and Kartika [9], that assessed the impact of the Family Hope Program on junior secondary school students' academic achievement. Until now, not many studies have specifically examined how education assistance program policies affect key indicators at the primary and junior secondary school levels. Literacy rate, Gross Enrollment Ratio, Net Enrollment Ratio, and Education Development Index are the indicators in this study. Therefore, this study attempts to fill the gap by analyzing the impact of educational assistance policies on these indicators using a mixed methods approach. This will allow for a more comprehensive understanding of its impact on education in elementary and junior high schools.

This study makes a new contribution to academia by examining the impact of education assistance policies on primary and junior secondary schools in Bintan Regency using human capital theory. This topic has not received much attention in previous literature. Besides that study uses quantitative analysis methods to assess the impact of education assistance policies on the quality of education in the region to fill gaps in previous research. This method not only enriches the discussion on education policy, but also helps us understand local dynamics in national and international education studies that are often overlooked.

2 Method

This study uses a quantitative approach that utilizes numerical data from observations to explain and describe the phenomenon under study. This approach relies on various mathematical analysis techniques supported by statistical methods [10], [11]. Through this approach, the formulated hypothesis can be tested using a representative sample, enabling the research findings to be generalized to describe the conditions of a broader population.

The data used is secondary data, including education assistance budget data for the period 2014-2024, which was obtained from the Education Office of Bintan Regency. Meanwhile, the Net Enrollment Rate, Gross Enrollment Rate, Literacy Rate, and

Education Development Index which are included in the education indicators were obtained from the Central Statistics Agency (BPS) of Bintan Regency.

Analytically, this study uses regression techniques as a statistical method to examine the relationship between dependent and independent variables and to predict the values of dependent variables based on these independent variables [12]. The research instrument consists of secondary data obtained from relevant regional agencies, which are then processed using SPSS version 26.

The analytical model used is multiple linear regression, with educational assistance as the dependent variable. The independent variables analyzed include literacy, gross participation in elementary or junior high school, net participation in elementary or junior high school, and educational development (Table 1). The analysis was conducted using two models: Model 1 for elementary school level and Model 2 for junior high school level.

Table 1. The Operationalization of the Concepts

Construct	Definition	Data Source
Educational assistance	Social assistance that provides to the students in Bintan, including uniforms, transportation, and stationery.	Bintan Regency Government
Literacy rate	The number of residents in an area who have basic skills in accessing information	BPS of Bintan
Gross participation	The percentage of the workforce in a population to the total working age population.	BPS of Bintan
Net participation	Comparison between students at a certain level of education and the school-age population and expressed as a percentage	BPS of Bintan
Educational development	Index to measure the level of educational attainment	BPS of Bintan

3 Results And Discussion

3.1 Descriptive Overview

Available data indicates that primary education is already easily accessible and almost universal. The Gross Enrollment Rate (GER) for elementary school is above 100 each year, it shows that not only are all children in the elementary school age group officially enrolled, but some of them are older or younger than the formal age range. The Net Enrollment Rate (NPR) for elementary school is also very high, ranging mostly between 98 and 100, showing that almost all children in the relevant age group are actually enrolled in affordable elementary school. The Literacy Rate (LR) also remained very high, fluctuating only slightly between 98 and 100, indicating that almost the entire population in the relevant age group at the basic level was already able to reading and writing.

Unlike primary education, secondary education and educational development still have room for improvement. GER and NPR for secondary schools were initially relatively lower and showed greater instability, including a clear decline in school enrollment around the middle of the period before finally increasing to the 80s and then approaching 100 in 2024. This pattern indicates that economic conditions, inter-level transitions, or other obstacles periodically limit access. But as time goes by policy actions or societal changes have helped improve the situation. Education Development (ED) regularly increased from around 70 to almost 78. What's happening in education development is a slower increase compared to the faster increase in participation indicators, which means it's more challenging to improve quality, equity, and learning achievement than simply ensuring that children are enrolled in school. As a whole , these figures indicate that future policies should prioritize improving the quality of learning and teaching, reducing repetition and dropout rates in middle schools, and paying attention to less developed regions so that improvements are in line with increased access to skills and educational results.

Table 2. Educational Performance of Bintan Regency

Year	GER		NPR		LR	ED
	ES	SS	ES	SS		
2014	107,16	95,31	98,7	87,17	98,65	71,65
2015	107,65	82,14	100	80,88	99,07	71,92
2016	112,09	90,44	92,26	84,86	98,34	72,38
2017	105,01	95,72	97,27	87,61	97,27	72,91
2018	104,62	97,53	99,69	86,73	97,90	73,41
2019	105,90	95,66	99,69	88,35	98,00	73,98
2020	106,16	95,66	99,63	89,10	100,00	76,04
2021	105,79	97,59	99,46	89,47	98,41	76,48
2022	106,24	95,78	99,19	86,76	99,03	76,80
2023	106,37	96,49	99,62	89,51	98,06	77,50
2024	105,48	92,91	99,75	99,23	98,96	77,96
Mean	106,59	94,11	98,66	88,15	98,52	74,64
Median	106,16	95,66	99,62	87,61	98,41	73,98
SD	2,02	4,46	2,25	4,43	0,74	2,36

Note: GER, Gross Enrollment Ratio; NPR, Net Participation Ratio; LR, Literacy Rate; ED, Educational Development; ES, Elementary School; JHS, Junior High School; SD, Standard Deviation
Source: Bintan Regency Central Statistics Agency (BPS)

Spending on education assistance programs in Bintan Regency generally upgrade from 2017 to 2024, with there was a significant increase from 2020 to 2022. The largest average cost was allocated to sea transportation, approximately 6.9 billion rupiah. This is followed by elementary school assistance, land transportation, and uniforms and stationery, ranging from 2.6 to 2.9 billion rupiah. In this series, no year dominated because the average and median values for each item were very close. However, a significant standard deviation indicates that the budget did not grow consistently each year.

Uniform and stationery assistance is relatively stable at around 3 billion rupiah. There was a sharp decline in 2022 to around 1.73 billion. This was followed by a strong

recovery to over 3.7 billion in 2024. A similar pattern was also seen in land transportation, with a higher standard deviation reflecting preponderant volatility. Allocations decline a little until 2019, then increased until 2021 and decline again in 2022. Finally peaking in 2024 at nearly 3.9 billion. This pattern represent that although basic support for student equipment and land transportation is prioritized, it remains sensitive to broader fiscal conditions and the expansion of targeted free school transportation services.

With the largest and most volatile budget item, sea transportation peaked at more than 9 billion rupiah in 2019. This dropped to around 4.8–5.1 billion in 2020–2021, before returning to around 7.3 billion in 2023–2024. The geographical of Bintan Island and the high price of boat services may be the reasons for this instability. Mobility restrictions and route adjustments during the pandemic may also have contributed to this instability. The post-2022 recovery shows a renewed emphasis on ensuring island students can reach school, in line with local free school transportation initiatives for coastal areas and outlying islands.

Available data shows that education assistance for elementary schools averaged 2.65 billion rupiah, but experienced a significant decline in 2020. This was followed by a gradually recovery, finally surpass pre-2020 levels in 2023–2024. Although not separately detailed in the statistics provided for junior high schools, it appears to follow the same pattern of contraction and recovery, in line with broader Indonesian programs that protect access to primary and junior high school education through both operational and scholarship support. On the whole, the data below illustrates a program that successfully weathered the contraction in 2020 until 2022 but has moved in recent years toward stronger and more comprehensive support for uniforms, transportation, and school-level assistance.

Table 3. Educational Assistance Program of Bintan Regency

Year	US		LT	ST
	ES	JHS		
2017	2,888,217,000	2,627,536,000	7,946,400,000	2,527,196,000
2018	2,911,837,500	2,565,456,000	8,138,400,000	2,634,400,000
2019	2,949,375,000	2,592,000,000	9,042,772,000	2,894,400,000
2020	3,019,500,000	2,687,631,000	5,117,112,000	1,630,680,000
2021	3,065,832,000	2,860,297,825	4,840,836,000	2,288,872,960
2022	1,727,224,320	1,360,874,620	5,576,892,000	2,642,235,000
2023	3,134,328,900	3,538,088,612	7,260,020,000	3,328,544,720
2024	3,714,006,730	3,892,781,641	7,371,000,000	3,230,850,200
Mean	2,926,290,181	2,765,583,212	6,911,679,000	2,647,147,360
Median	2,984,437,500	2,657,583,500	7,315,510,000	2,638,317,500

SD	551,865,376.3	750,698,112.3	1,546,419,106	540,143,715.1
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Note: US, Uniform and Stationery; LT, Land Transportation; ST, Sea Transportation; ES, Elementary School; JHS, Junior High School; SD, Standard Deviation
Source: Educational Office of Bintan Regency (2025)

3.2 Results of Model 1 (Elementary School)

The results of hypothesis testing at the elementary school level show that the education assistance program has a limited effect on most education indicators. Table 1 shows that this program does not have a statistically significant effect on literacy rate ($\beta = -3.306E9$, $t = -1.782$, $p = 0.125$), gross enrollment ratio ($\beta = -1.034E9$, $t = -1.289$, $p = 0.245$), or net participation ratio ($\beta = 2.583E7$, $t = 0.018$, $p = 0.986$). Conversely, statistically significant effects were observed for educational development (β These results indicate that the Education Assistance Program at the primary school level improved overall educational development outcomes. In the study period, enrollment, participation, and literacy metrics were not significantly impacted by the program.

Table 4. Hypotheses Testing

Variable	β	<i>t</i> -statistic	Sig.	Decision
LR	-3.306E9	-1.782	0.125	Not significant
GER	-1.034E9	-1.289	0.245	Not significant
NPR	2.583E7	0.018	0.986	Not significant
ED	1.545E9	3.018	0.023	Significant

Note: Independent Variable, Educational Assistant Program; GER, Gross Enrollment Ratio; NPR, Net Participation Ratio; LR, Literacy Rate; ED, Educational Development

The R-square results show a strong relationship between educational assistance programs and academic achievement (GER, NPR, LR, and ED). With a value of R equal to 0.896 and an R2 value of 0.804, the program explains approximately 80.4% of the variation in these variables. The adjusted R2 value of 0.673 shows that most of the variation has been explained after considering the complexity of the model. However, positive autocorrelation in the residuals was detected, according to the Durbin-Watson statistic of 1.142, which indicates that model assumption issues may need to be addressed. On the whole, enrollment, participation, literacy, and education development metrics are significantly affected by this program. Table 5 shows the results of the R-squared test.

Table 5. R-Square Test

Statistic	Values
<i>R</i>	0.896
<i>R</i> Square	0.804
Adjusted R-Square	0.673
Std. Error of Estimate	3.258E9
Durbin-Watson	1.142

3.3 Results of Model 2 (Junior High School)

The results of hypothesis testing indicate that the educational assistant program does not have a statistically significant effect on educational outcomes in Bintan Regency at the elementary and junior high school levels. As shown in Table 6, the program's coefficient for literacy rate is negative ($\beta = -3.711\text{E}9$) with a *t*-statistic of -1.944 and a significance value of 0.100 , indicating no significant relationship. Similarly, the coefficients for gross enrollment ratio ($\beta = 2.599\text{E}7$; $t = 0.077$; $p = 0.941$) and net participation ratio ($\beta = 3.747\text{E}8$; $t = 0.958$; $p = 0.375$) are positive but statistically insignificant. Educational development also shows a positive coefficient ($\beta = 1.411\text{E}9$; $t = 1.767$; $p = 0.128$), although the effect remains statistically insignificant. In general, these findings show that the education assistance program has not had a measured impact on enrollment, participation, literacy, or educational development indicators within the study period.

Table 6. Hypotheses Testing

Variable	β	<i>t</i> -statistic	Sig.	Decision
LR	-3.711E9	-1.944	0.100	Not significant
GER	2.599E7	0.077	0.941	Not significant
NPR	3.747E8	0.958	0.375	Not significant
ED	1.411E9	1.767	0.128	Not significant

Note: Independent Variable, Educational Assistant Program; GER, Gross Enrollment Ratio; NPR, Net Participation Ratio; LR, Literacy Rate; ED, Educational Development

The *R*-square test results for the junior high school model indicate a strong overall relationship between the educational assistant program and the included educational outcome variables. The strong correlation between the independent and dependent variables, as shown in the correlation coefficient (*R*) in Table 7, is 0.860 . The *R*-squared value of 0.739 mean that the model could explain about 73.9% of the variance in junior high school results. Even after adjusted for the amount of predictors, the adjusted *R*-squared value remains relatively high at 0.565 , implying that 56.5% of the variation can still be explained even though the complexity of the model is taken into accounting. The value deviating from the mean of the regression line is indicated by a standard error estimate of $3.756\text{E}9$. In addition, there is a serious autocorrelation problem in the residuals, according to the Durbin–Watson statistic of 1.493 , which indicates that the regression model is statistically reliable.

Table 7. R-Square Test

Statistics	Values
<i>R</i>	0.860
<i>R</i> Square	0.739
Adjusted <i>R</i> Square	0.565
Std. Error of Estimate	3.756E9
Durbin-Watson	1.493

3.4 Discussion

This study analyzes how the education assistance program in Bintan Regency has impacted core education indicators: Gross Enrollment Ratio (GER), Net Participation Rate (NPR), Literacy Rate (LR), and Education Development (ED). These indicators are researched at the elementary and junior high school levels. Overall, the results show that the program did not have a statistically significant impact on most general education indicators. However, there was a notable exception at the primary school level, where the education assistance program significantly improved student development.

It is known that GER and NPR have no significant effect on both levels of education indicates that the Education Assistance Program does not directly influence student enrollment or participation. There are structural and socio-economic factors that can influence these indicators, such as population dynamics, households' income, parents' awareness, and school location accessibility. As a results, in order to boost student enrollment and participation, broader policy interventions beyond existing education assistance programs may be necessary.

In the same way, the program did not show a statistically significant impact on literacy rates. Literacy results largely depend on early childhood education experiences, curriculum effectiveness, and long-term teaching skills. During the study period, district-level literacy indicators likely did not change quackly or measurably, although teaching assistants can help improve classroom management and reduce teachers' workloads. These results indicate a time delayed effect; improvements in literacy will only be seen after a sustained program has been implemented [13].

Inversely, the educational assistant program has a statistically significant positive impact on educational development at the elementary school level. These results indicate that the program contributes to broader aspects of educational quality, such as learning support, classroom effectiveness, student engagement, and the school environment, all of which are often measured by mean of composite educational development indicators. Basic education is the initial stage in the learning process, and providing additional educational support at this stage can lead to greater overall educational progress compared to higher levels [14].

The lack of a similar significant effect at the junior high school level may be attributed to the increasing complexity of subject matter and the greater specialization required in teaching. Educational assistance may have a more limited role in supporting specific teaching at this level, thereby reducing its potential impact on educational development outcomes. Additionally, adolescent learning outcomes are influenced by a broader range of external factors, including peer effects, motivation, and family background, which may weaken the program's observable influence [15].

Collectively, these results show that educational assistance programs can help improve the quality of education, their impact is limited to macro-level metrics such as enrollment, participation, and literacy. It appears this program is more effective in improving educational development at the primary school level, emphasizing the importance of early educational intervention. Increased program coverage, improved assistant training, and its integration with additional interventions focusing on institutional and socioeconomic barriers to education should be considered in future

policy plans [16]. To determine the indirect and long-term impacts of the program, further research is needed with a longer time horizon and more control variables.

4 Conclusion

The findings of this research, the educational assistance program in Bintan Regency has no statistically significant impact on Gross Enrollment Ratio, Net Participation Ratio, or Literacy Rate at the primary and junior high school levels. This indicates that the general indicators of access, participation, and achievement in primary education were not affected by the program. However, this program shows a significant positive impact on educational development at the primary school level, demonstrating that educational assistance improves the quality of basic education more than participation results. In middle school, absence rate has a significant impact. This may further indicate that the program is working well across different educational levels. All of these results indicate that while educational assistance programs play an important role in the education system, the benefits of educational development are more clearly seen from a qualitative perspective. The outcome also indicates that the program must to be strengthened and integrated with broader education policies to have a more comprehensive and long-term effect.

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