



Mapping Educational Participation: A Quadrant Analysis of Gross and Net Enrollment Rates (2020–2024)

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Abstract: This study aims to analyze quadrant mapping of the Gross Enrollment Rate (GER) and Net Enrollment Rate (NER) towards measuring education participation in Aceh Province from 2020 to 2024. Descriptive quantitative approaches were applied throughout this research, where secondary data were obtained from education statistics by government agencies and national surveys. It applies the quadrant technique with four categories of education participation rates based on the national average net and gross enrollment rates. The results demonstrate that primary and junior secondary education belong to Quadrant I (ideal) since there is a consistently higher net and gross enrollment rate than the national average. In contrast, senior secondary education is situated on Quadrant II (non-ideal) with a high gross enrollment rate but a low net enrollment rate, indicating problems such as late enrollment or high dropout rates. The findings of this research confirm the imperative need for data-informed and context-specific education policies for autonomous regions such as Aceh to reduce the GER-NER differential. The strategy is vital for promoting inclusive, equitable, and sustainable education development aligned with national targets and the Sustainable Development Goals (SDGs).

Abstrak: Penelitian ini bertujuan untuk menganalisis pemetaan kuadran Angka Partisipasi Kasar (APK) dan Angka Partisipasi Murni (APM) untuk mengukur partisipasi pendidikan di Provinsi Aceh dari tahun 2020 hingga 2024. Metode yang digunakan adalah deskriptif kuantitatif, di mana data sekunder diperoleh dari statistik pendidikan resmi serta survei tingkat nasional. Penelitian ini menggunakan metode kuadran dengan empat jenis tingkat partisipasi pendidikan sesuai dengan rata-rata nasional angka partisipasi kasar dan angka partisipasi murni. Temuan menunjukkan bahwa pendidikan dasar dan menengah pertama masuk ke dalam Kuadran I (ideal), dengan angka partisipasi kasar dan angka partisipasi murni yang secara konsisten melampaui rata-rata nasional. Di sisi lain, pendidikan menengah atas berada di Kuadran II (tidak ideal), yang ditandai dengan APK yang tinggi tetapi APM yang rendah, yang menunjukkan adanya isu-isu seperti keterlambatan masuk sekolah atau angka putus sekolah. Temuan dari penelitian ini menekankan pentingnya kebijakan pendidikan yang didasarkan pada data dan relevan dengan konteks daerah otonom seperti Aceh, guna mengatasi kesenjangan antara Angka Partisipasi Kasar (APK) dan Angka Partisipasi Murni (APM). Strategi ini sangat penting untuk mendorong pembangunan pendidikan yang inklusif, adil, dan berkelanjutan yang selaras dengan tujuan nasional dan Tujuan Pembangunan Berkelanjutan (SDGs).

A. Introduction

Education serves as the principal key foundation for developing superior and competitive human resources, particularly in confronting the Industrial Revolution and global challenges facing the world in the 21st century (Ningsih & Rojikun, 2021; Sanga & Wangdra, 2023; Sari, 2022). Equitable, high-quality education is a fundamental right of every citizen and a strategic tool for accelerating and expediting social and economic development. In this context, the Government of Indonesia has enacted various policies, including a 12-year compulsory education program, to ensure consistent, equal access to education from primary to senior secondary level (Khairunnisa & Tinus, 2018; Pratiwi & Siswanto, 2023).

The success of national education programs is generally measured through two leading indicators: the Gross Enrollment Rate (GER) and the Net Enrollment Rate (NER). GER depicts the quantity of students regardless of the most reliable age restriction, while NER is the proportion of students at the optimum age for their education level (Pudyastuti & Mulyaningsih, 2021; Rohmani, 2020; Safira & Wibowo, 2021). The difference between GER and NER may reflect irregularities in school age, either due to late entry, grade repetition, or dropout. Therefore, these two indicators are used to quantitatively describe the level of education participation and as analytical tools in evaluating the quality and regularity of the education system.

Recent studies emphasize that education planning must be strategic and based on accurate data. They state that the weakness of educational institutions in Indonesia lies in their lack of capacity to prepare plans that are adaptive to the dynamics of the times (Mahardhika & Raharja, 2023). Sustainable and competitive education can only be achieved if education policy integrates careful planning, a 21st-century skills-based curriculum, technology utilization, and cross-sector collaboration (Aini, 2024; Sari, 2022).

In the regional context, Aceh Province is one of the regions with its uniqueness in education management, given its status as a special autonomous region. Data from the Central Bureau of Statistics shows that the education participation rate in Aceh, especially at the primary and junior secondary levels, is consistently higher than the national average. However, these achievements do not always reflect the regularity of school-age participation. The phenomenon of a high GER but low NER at the senior secondary level indicates a potential mismatch between the age of students and the level of education pursued (Fitriah, 2020; Samhudi et al., 2022). This indicates structural problems in the sustainability of education between levels.

In addition to the age factor, Aceh also faces complex geographical and socio-economic challenges. The region's varied topography, limited education infrastructure in remote areas, and welfare disparities between regions are obstacles to realizing equitable and inclusive education (Siwitomo et al., 2023). This situation demands a policy approach that is contextual, evidence-based, and able to identify specific problems at each level of education.

In elementary education, children's readiness to enter formal schooling plays an important role in maintaining educational participation. A study found that using a simple "alphabet box" game in a rural kindergarten in Pidi Jaya greatly enhances literacy skills, showing how basic intervention can support smooth educational instruction and long-term partnerships (Jamil & Dewita, 2024).

The findings of foreign studies also support the results of this study, which emphasizes the importance of GER and NER indicators in education planning. Schendel & Alcott (2024) argue that GER is often misconstrued as an indicator of educational success, as it includes any learners over the ideal age, causing access inequalities to be obscured. A study of the RUSA policy in India (Baruah & Goswami, 2024) points out that while affirmative action policies can effectively raise GER, regional disparity remains a significant challenge. In contrast, Pal (2024) referred to improving GER in China through integrated education governance and sustained financial investment in education. The importance of studying GER and NER together in searching for the fundamental dynamics of education can be drawn from the three studies discussed below.

However, few studies have specifically highlighted the relationship between GER and NER in the context of school-age regularity, especially in autonomous regions such as Aceh. Most previous studies only present GER and NER as aggregate data without mapping the relative positions between education levels or regions against the national average. In reality, this mapping type is crucial for evaluating the efficacy of educational policies and creating strategic measures that address the specific needs of different regions. Therefore, this study fills the gap by offering the quadrant approach as an analytical method that can visually and systematically describe the condition of educational participation based on GER and NER.

Based on this background and urgency, this study aims to analyze primary and secondary education participation in Aceh Province during the 2020-2024 period using a quadrant approach to the Gross Enrollment Rate (GER) and Net Enrollment Rate (NER) data. This approach maps the positions of primary, junior secondary, and senior secondary education levels in Aceh based on the national average midpoint. It identifies the gap between GER and NER as an indicator of school-age regularity. It also seeks to formulate data-driven policy strategies to improve and sustain educational participation in a more inclusive and locally appropriate manner in Aceh.

B. Method

This research uses a quantitative descriptive approach to describe the objective conditions of educational participation in Aceh Province based on data on the Gross Enrollment Rate (GER) and Net Enrollment Rate (NER) from 2020 to 2024. This type of research was chosen because it allows researchers to analyze trends and data distribution numerically and systematically.

The research is focused on the Aceh Province area, with the unit of analysis covering three levels of education: Primary Education, Lower Secondary Education, and Upper

Secondary Education. This study is based on secondary data, so it does not directly deal with individual participants or respondents. Instead, it uses official aggregated data provided by government agencies.

This study uses secondary data from the official National Education Statistics Report document, BPS, and the Ministry of Education. The collected data in a time series from 2020 to 2024 will enable the longitudinal analysis of the GER and NER trends. Data analysis activities were conducted by following these steps:

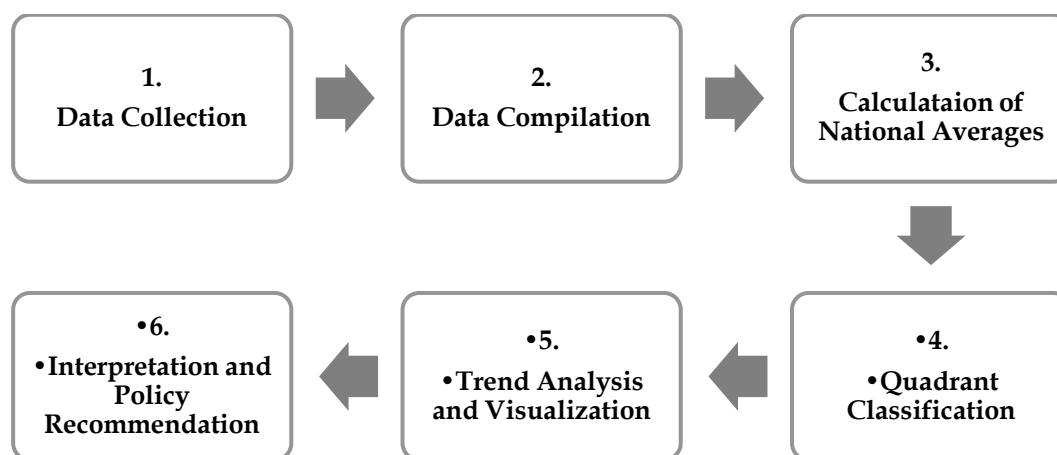


Figure 1. Research Step

The data analysis technique in this study follows a systematic sequence beginning with the collection of secondary data on the gross enrollment rate and net enrollment rate for primary and secondary education in Aceh Province from 2020 to 2024. The accrued statistics are compiled into a time collection format to facilitate the identification of tendencies over time. Subsequently, country-wide averages for GER and NER are calculated as benchmarks. Based on comparing Aceh's figures and country-wide averages, the quadrant class categorizes the region's educational participation performance. This type is then visualized using graphs and quadrant maps, enabling a more honest interpretation of developments and styles. The last stage includes deciphering the findings inside the specific context of Aceh and formulating records-driven coverage guidelines to enhance instructional participation in the location.

C. Results and Discussion

Result

This study shows the trends in Gross Enrollment Rate (GER) and Net Enrollment Rate (NER) in primary and secondary schooling in Aceh Province from 2020 to 2024. The consequences show that GER and NER achievements at the fundamental and junior high school tiers are above the national average. There may be an enormous gap between GER and NER at the senior high school level in assessment.

Table 1. GER and NER at the Elementary School in Aceh Province and Nationally

Description	GER and NER for Elementary School in Aceh Province									
	GER					NER				
	2020	2021	2022	2023	2024	2020	2021	2022	2023	2024
ACEH	108.7	108.1	108.34	108.48	108.57	99.03	98.95	99.07	98.97	97.96
INDONESIA	106.32	106.2	106.27	105.62	104.82	97.69	97.8	97.88	97.89	97.94

The figure shows that the GER and NER achievements for elementary schools in Aceh are stable and consistently higher than the national average. This indicates that almost all elementary school-aged children attend school on time, reflecting ideal conditions (Quadrant I).

Table 2. GER and NER for Junior High Schools in Aceh Province and the National

Description	GER and NER for Junior High School in Aceh Province									
	GER					NER				
	2020	2021	2022	2023	2024	2020	2021	2022	2023	2024
ACEH	97.79	97.74	95.02	95.51	94.3	86.87	86.95	88.21	84.85	84.22
INDONESIA	92.06	92.8	92.11	92.51	92.21	80.12	80.59	80.89	81.35	81.73

Junior high schools in Aceh are also considered ideal, although the Gross Enrollment Ratio (GER) trend is starting to decline. This decline needs to be watched closely, as it could lead to challenges in continuing education from elementary to junior high school.

Table 3. GER and NER for Senior High Schools in Aceh Province and nationally

Description	GER and NER for Senior High School in Aceh Province									
	GER					NER				
	2020	2021	2022	2023	2024	2020	2021	2022	2023	2024
ACEH	90.9	92.63	92.53	93.8	96.6	70.7	70.8	71.16	71.7	70.94
INDONESIA	84.53	85.23	85.49	86.34	87.29	61.25	61.65	61.97	62.53	64.32

In the table above, senior high school students show a relatively high gross enrollment rate, but the difference in net enrollment ratio is quite significant. This indicates irregularities in school-age children that need serious attention. There are two main findings in this study, namely:

1. The Average GER and NER for Primary and Secondary Education (2020 to 2024)

Based on national average calculations, which were then compared with Gross Enrollment Rate (GER) and Net Enrollment Rate (NER) achievements in Aceh, elementary and junior high schools were classified in Quadrant I (Ideal) because their GER and NER were higher than the national average. Meanwhile, senior high schools were classified in Quadrant II (Not Ideal) because although GER was high, NER was still low.

Table 4. Average APK and APM All Level Education in Aceh Province

Description	GER Aceh	NER Nasional	GER Aceh	NER Nasional	Difference (GER-NER)	Quadrant
Elementary School	106.5	104.12	98.796	97.84	7.23%	Quadrant I
Junior High School	93.888	89.95	86.22	80.936	8.89%	Quadrant I
Senior High School	89.252	81.12	71.06	62.344	20.38%	Quadrant II

At the primary education level, Aceh is in Quadrant I (Ideal), where the gross enrollment rate (106.5%) and net enrollment rate (98.8%) are pretty high, even exceeding the national average (GER 104.12% and NER 97.84%). This indicates that almost all primary school-aged children are enrolled in formal education, and most go to school on time according to their age level.

The lower secondary education level also lives in Quadrant I (Ideal), where the Gross Enrollment Rate (93.9%) and Net Enrollment Rate (86.2%) are higher than the national average (GER 89.95% and NER 80.94%). Although classified as ideal, GER has declined slightly in recent years, which reflects possible issues in the continuity of education from primary to junior high school.

Conversely, the upper secondary education level is in Quadrant II (Non-Ideal). Although Aceh's GER reached 89.3% (higher than the national average of 81.12%), the NER is only 71.06% (the national average of 62.34%). The significant gap between GER and NER (approximately 20.38%) indicates that many students are not attending school at the appropriate age level.

Based on national average calculations, which were then compared with gross enrollment rate and net enrollment rate achievements in Aceh, primary school and lower secondary school were classified in Quadrant I (Ideal) because their GER and NER were higher than the national average. Meanwhile, upper secondary schools were classified in Quadrant II (Not Ideal) because although GER was high, NER was still low.

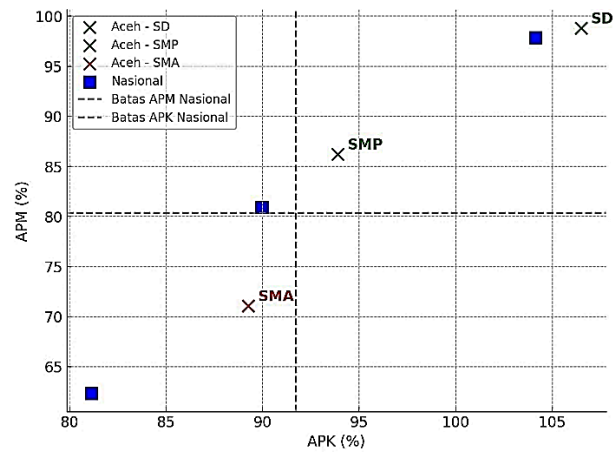


Figure 2. Quadrant of GER and NER in Aceh and Nationally

Based on national average calculations, which were then compared with gross enrollment rate and net enrollment rate achievements in Aceh, primary school and junior high school were classified in Quadrant I (Ideal) because their GER and NER were higher than the national average. Meanwhile, senior high schools were classified in Quadrant II (Not Ideal) because although GER was high, NER was still low.

2. Aceh Province and National GER and NER Trends

This study focuses on the gross and net enrollment ratio achievements in Aceh Province from 2020 to 2024, which are then presented in a trend table for the last four years.

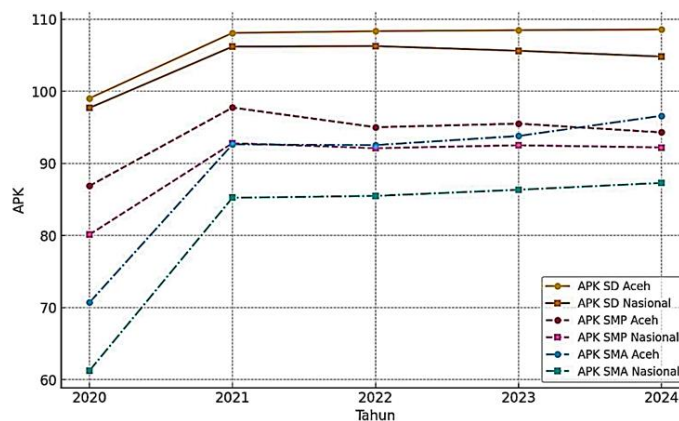


Figure 3. Comparison of Gross Enrollment Rates (GER) 2020–2024

This figure shows trends in Gross Enrollment Rates (GER) at the primary and secondary education levels, comparing Aceh to national averages during the 2020–2024 timeframe. The data show that Aceh continued to excel above the national average at all levels of education during the observed years, indicating sustained increases in educational access and more involvement across the province. In addition, the GER for secondary education is far more variable than for primary education, suggesting that socio-economic

undercurrents may prevent students from remaining engaged in their education once they reach secondary school.

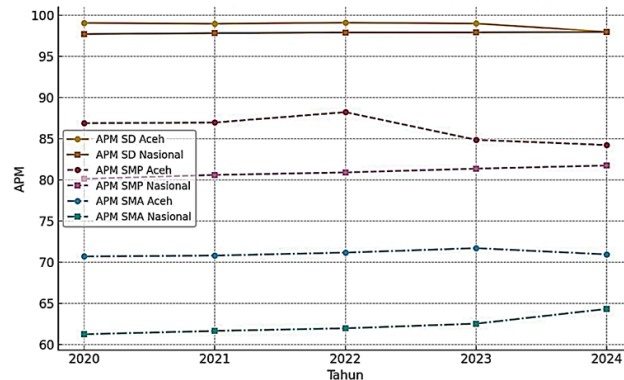


Figure 4. Comparison of Net Enrollment Rates (NER) 2020–2024

This figure shows Aceh's Net Enrollment Rates (NER) compared to the national average for 2020–2024. The findings indicate that Aceh's NER remained above the national average for all levels of education. The analysis of student age shows that students are mostly in sync with the rate or level expected for each grade, showcasing a substantial transformation in the demographic outreach and the proportion of enrolled students. However, differences still exist between levels of education, notably in secondary education, where the NER is lower overall. This could mean difficulties in retaining school-age students in the formal education system at this level.

Discussion

This discussion seeks to address the core problem statement, that is, where the participation of Aceh's primary and secondary education in 2020–2024 stands in terms of analysis by the quadrant method under the gross enrollment rate and the net enrollment rate indicators. The research results suggest that Aceh's primary and lower secondary schools' participation always stays in Quadrant I (ideal). In contrast, upper secondary schools remain at Quadrant II (non-ideal) because there is a significant difference between the gross and net enrollment ratios.

Aceh's high position at the national level in the achievement of GER and NER at the primary and lower secondary school levels expresses the implementation of the nine-year mandatory education program and the success of local government interventions toward access to basic education. Achievement at the lower secondary school level shows irregular student ages, characterized by a high gross enrollment rate but a low net enrollment rate. The 20% gap between GER and NER at this level indicates students who have failed to reach the right grade level or are lagging (Badan Pusat Statistik Provinsi Aceh, 2024).

This phenomenon is not entirely due to demographic factors but to the lack of attractive instructional approaches that inspire continuous learning. [Ajirni et al \(2024\)](#) using simple teaching aids from recycled materials improved student engagement and learning

results in MAN IDI Reyuk, proving that low resources can also contribute to retention and age-appropriate education through innovations.

This observation follows up on the (Schendel & Alcott, 2024), who suggest that the gross enrollment rate is misleadingly used to indicate educational system success since it does not consider regularity by age. In this regard, the net enrollment rate is an improved measure of the quality of educational access, as reinforced by indicators 4.1 and 4.6 in the Sustainable Development Goals (Kemdikbud, 2017). The exclusion of the net enrollment rate from the prioritization indicators of the 2020–2024 Strategic Plan of the Ministry of Education and Culture indicates the weaknesses of the country's policy framework, given the critical function of the net enrollment rate in depicting school-going disparities by age.

In addition, an analysis of the last five years indicates that the Gross Enrollment Rate (GER) and Net Enrollment Rate (NER) in Aceh have registered quantitative improvements. However, disparities by age at the upper secondary school level have failed to improve significantly. These have significant implications for education sustainability and achievement of the 12-Year Compulsory Education Program. Previous research illustrates that although human development indicators in Aceh have added value to the economy, the existing regional inequalities and vertical imbalances, especially in educational and occupational distribution, still permeate access to education across different age cohorts. (Utami, 2020). As observed in the (BPS Aceh, 2024), the target GER for upper secondary school of over 95% has yet to be fully attained in Aceh, with the figure remaining at 93.8% in 2023, while that for NER remains below 72%.

This disparity has structural, cultural, and geographical causes. The rugged terrain of Aceh, combined with uneven educational facility distribution, such as the poor teacher-pupil ratio for senior high schools (1:9) and high school/vocational school concentration in the cities, hinders access to secondary education by some age groups. These are supported by the lower proportion of residents who graduate from high school/vocational school in some areas, like Gayo Lues and Aceh Singkil (BPS Aceh, 2024).

Pal (2024) has supported this, focusing on the necessity of regional education governance to help promote the sustainability of education at different levels. In Aceh, inclusive and community-oriented methods are essential, according to Fitriah (2020), who recommends using a community empowerment model to aid educational transition success.

From an educational theory viewpoint, the quadrant method applied in this research broadens the applicability of the Educational Access and Regularity theory, highlighting the number of students and the regularity and continuity of educational levels by age. The quadrant method can also provide cross-dimensional analysis—quantitative (GER) and qualitative (NER)—capable of acting as an instrument to assess regional education policy. The theoretical contribution of this research is significant for regional education policies, especially for regions with distinctive attributes like Aceh as an autonomous region.

Moreover, using longitudinal data and education statistics enhances the integrity of the research results. This is crucial to the development of an evidence-based system of policy-making, as argued by (Mahardhika & Raharja, 2023), who state that one of the

primary weaknesses of Indonesia's educational institutions is the lack of utilization of data for adaptive planning. As a conclusion to this discussion, it is crucial to highlight that to reach the target of education development at the national level and the SDGs, education policies at the level of regions, such as Aceh, are inadequate if they aim only to maximize the gross enrollment ratio scores. Of more excellent value is reducing the GER-NER gap to enhance the intensity of schooling participation and school-age regularity. Region-focused interventions, micro-data capturing, and community-based participatory methods are applicable solutions to enhancing educational irregularities, especially at the secondary level.

D. Conclusion

This study concludes that the quadrant analysis using the gross and net enrollment rates provides a comprehensive framework for evaluating educational participation dynamics across education levels. Specifically, it enables a more precise identification of school-age regularity and continuity in enrollment, which is essential in assessing the effectiveness of education policies. The findings affirm that while primary and junior secondary education enrollment appears constant and aligned with national targets, senior secondary education exhibits significant gaps requiring strategic intervention.

The implications of this research spotlight the need for more centered, data-driven education policies, particularly at the senior secondary level. Policymakers and the school government must prioritize improving the internet enrollment price by designing interventions that cope with age-associated inconsistencies in school participation. These encompass increasing access to flexible learning programs, improving transition mechanisms among training ranges, and enhancing guidance structures for students at risk of falling behind. The quadrant framework can also serve as a monitoring device for local governments to assess the fairness and sustainability of training access over time.

Future studies should comprise additional indicators, such as dropout fees, common years of schooling, and scholar transition rates among education tiers. Qualitative tactics should also capture contextual factors influencing participation, including socio-cultural and financial barriers, specifically in underserved or faraway communities.

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