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Exploring Economic Drivers of Literacy: Advancing Equitable Education for Marginalized Communities in Pakistan

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Abstract
This research investigates the influence of economic factors on literacy rates in Pakistan, focusing on GDP per capita, government expenditure on education (as percentages of GDP and total government expenditure), and employment rate from 2000 to 2023. The results show that government expenditure on education as a percentage of total expenditure greatly affects literacy rates, though unexpectedly negatively, while GDP per capita and employment rate show non-significant relationships. The research emphasizes the necessity for policy reforms aimed at equitable resource allocation, particularly in marginalized communities, to enhance literacy and educational access. Recommendations include incorporating financial literacy and qualitative research to better address barriers to inclusive education.

Keywords: Economic factors, literacy rate, GDP per capita, government expenditure on education, employment rate, marginalized communities, equitable education, Pakistan.

Introduction

The landscape of global education reveals profound disparities, particularly affecting marginalized and vulnerable populations in Pakistan. Despite international commitments such as the Sustainable Development Goals (SDGs), significant inequities persist. The imperative to provide equitable access to education, irrespective of socio-economic status, ethnicity, gender, or disability, has never been more pressing. Historically, marginalized communities have been systematically excluded from quality education, leading to entrenched cycles of poverty and social injustice (UNESCO, 2018). This research is driven by these unresolved issues and recognizes education as a pivotal tool for cultivating inclusivity and empowering people in Pakistan.

Context of the Study

This study prioritizes on the accessibility and inclusivity of education for marginalized communities within the framework of sustainable development in Pakistan. The persistent educational inequality faced by these groups impedes their social and economic participation in society. Despite policy developments, barriers such as inadequate infrastructure, discriminatory practices, and limited resources continue to impede access to quality education for marginalized populations (Walker, 2018). This research seeks to investigate these barriers and propose actionable solutions for inclusive education systems, aligning with SDG 16's mandate of promoting peaceful and inclusive societies.

Purpose of the Study

The primary purpose of this study is to examine the factors influencing the accessibility and inclusivity of education for marginalized communities in Pakistan from 2000 to 2023, using secondary quantitative data. The specific objectives are:

1. To examine the effects of GDP per capita, Government Expenditure on Education, Financial Literacy, and Employment Rate on Literacy Rate in Pakistan.
2. To assess the long-term trends in these variables and how they contribute to educational inequality.

3. To establish correlation and causality using quantitative methods such as regression analysis.
This research is confirmatory in nature and seeks to validate the hypotheses using secondary data from sources like the World Bank and Global Findex, concentrating on Pakistan's context.

Hypothesis

For GDP per Capita (X1)
H0: There is no significant relationship between GDP per capita and literacy rate in Pakistan.
H1: There is a significant relationship between GDP per capita and literacy rate in Pakistan.

For Government Expenditure on Education (Percentage of GDP) (X2)
H0: There is no significant relationship between Government Expenditure on Education (percentage of GDP) and literacy rate in Pakistan.
H2: There is a significant relationship between Government Expenditure on Education (percentage of GDP) and literacy rate in Pakistan.

For Government Expenditure on Education (Percentage of Total Government Expenditure) (X3)
H0: There is no significant relationship between Government Expenditure on Education (percentage of total government expenditure) and literacy rate in Pakistan.
H3: There is a significant relationship between Government Expenditure on Education (percentage of total government expenditure) and literacy rate in Pakistan.

For Employment Rate (X4)
H0: There is no significant relationship between employment rate and literacy rate in Pakistan.
H4: There is a significant relationship between employment rate and literacy rate in Pakistan.

These hypotheses set the foundation for testing each variable's impact on literacy rate in the context of Pakistan using a multiple regression model.

Significance and Scope

This research holds significance in informing future studies on educational equity in Pakistan. By using quantitative data, the study contributes to the academic discourse on sustainable development and social justice. The scope is delimited to Pakistan from 2000 to 2023, utilizing secondary data for quantitative analysis.

Operational Definitions

Literacy Rate (DV): Percentage of people who can read and write at a specified age.
Gross Domestic Product [er capita (GDP per capita) (IV): Total value of goods and services produced within a country.
Government Expenditure on Education (IV): Public spending on education as a percentage of GDP per capita.
Financial Literacy (IV): Ability to understand and effectively use financial skills, such as personal financial management.
Employment Rate (IV): Percentage of the working-age population that is employed.

Literature Review

Historical Background

Inclusive education has changed dramatically over the decades, with early roots in the universal right to education recognized by various international declarations. This section provides a brief overview of the development of inclusive education policies and practices globally, with a focus on their implications for marginalized communities.

Theoretical Frameworks Supporting Inclusive Education

The theoretical underpinning of inclusive education is critical to understanding its impact on marginalized communities. Amartya Sen's Capability Approach, as highlighted in several works, including "Re-framing Inclusive Education Through the Capability Approach" (Sen and Nussbaum, 2014), provides a robust framework for evaluating educational equity. Sen's method highlights the significance of enabling people to accomplish functioning that they value, which aligns with the principles of inclusive education.

Martha Nussbaum's contributions, particularly through her quantitative analysis in "Capabilities as Fundamental Entitlements: Sen and Social Justice" (Nussbaum, 2014), further expand on the capability approach by promoting for educational procedures that improve individual capabilities. Nussbaum's work stresses the necessity of educational systems that cater to diverse needs, cultivating a more inclusive environment.

Empirical Studies on The Effectiveness of Inclusive Education for Marginalized Communities

Quantitative research plays a pivotal role in assessing the effectiveness of inclusive education. Pauline Rose's work, "Education Inequality: The Extent, Causes, and Consequences" (Rose, 2015), provides comprehensive data on educational disparities and draws attention to the difficulties encountered by marginalized communities in accessing quality education. Her analysis is essential to comprehension of the systemic barriers that impede educational inclusivity.

Similarly, Rukmini Banerji's "Annual Status of Education Report (ASER)" offers extensive quantitative data on children's schooling and learning levels across India, providing illumination on the gaps and progress in educational inclusivity (Banerji, 2018). This empirical evidence is instrumental in finding areas that require targeted interventions to enhance educational outcomes for marginalized groups.

Recent studies emphasize the correlation between education expenditure and literacy rates within marginalized communities. For example, Zhang and Li (2021) explore how government expenditure on education as a share of GDP directly impacts the literacy rates in lower-income countries, emphasizing significant disparities. Similarly, Khatun and Rahman (2022) analyze the role of financial literacy and employment opportunities in promoting inclusive education, identifying a positive correlation between increased financial literacy and improved access to education for marginalized groups.

Secondary Research on Policy and Practice in Inclusive Education

Secondary research offers observations into the broader policy and practice landscape of inclusive education. Karen Mundy's "Global Governance, Educational Change" reviews the impact of international governance on educational reforms, providing a macro-level perspective on the implementation of inclusive education policies (Mundy, 2019). This work discusses the importance of global cooperation in advancing educational inclusivity. Joel Samoff's "Institutionalizing International Influence: The Impact of Donor Programs on Education Policy in Africa" critically examines the role of donor agencies in shaping educational policies (Samoff, 2020). This secondary analysis highlights both the potential benefits and pitfalls of external influences on national education systems, stressing the necessity for context-specific approaches.

The literature review discusses the importance of a multifaceted approach to inclusive education that integrates theoretical frameworks, empirical data, and secondary research. The Capability Approach by Sen and Nussbaum provides a strong theoretical foundation, promoting educational techniques that improve individual capabilities and promote equity.

Empirical studies by researchers like Pauline Rose and Rukmini Banerji offer valuable quantitative data that highlight the existing disparities and the effectiveness of various educational interventions. These studies provide a basis for identifying best practices and areas needing improvement.

Secondary research by Karen Mundy and Joel Samoff offers a broader perspective on the policy and practice landscape, illustrating the difficulties of implementing inclusive education in diverse contexts.

These observations are essential for creating contextually relevant policies that address the unique difficulties encountered by marginalized communities.

The review identifies a substantial disparity in the literature regarding the long-term impact of inclusive education policies on marginalized communities in Pakistan. This study aims to fill this gap by examining the effectiveness of current inclusive education initiatives and proposing strategies for sustainable development. The research questions derived from this literature review will guide the research in order to investigate the relationship between inclusive education and sustainable development, ultimately contributing to the broader field of educational research. By integrating these different viewpoints, this study seeks to give a thorough insight of the challenges and opportunities in promoting accessible and inclusive education for marginalized communities in Pakistan. This approach will ensure that the research addresses the intricate interaction of factors influencing educational outcomes and contributes to the development of effective, sustainable educational policies.

Research Methodology

This study uses secondary quantitative research methodology, concentrating on existing data from the World Bank from 2000 to 2023. Secondary data is chosen to enable a broad analysis of long-term trends in education. The study aims to test the relationship between literacy rates (dependent variable) and four independent variables: GDP per capita, Government Expenditure on Education, Financial Literacy, and Employment Rate. The hypotheses are tested using multiple regression analysis, allowing for the identification of correlations and predictive relationships between the variables.

Research Design

The research follows quantitative design, employing statistical analysis to identify the relationships between the variables. The multiple regression analysis is used to explore the influence of GDP per capita, government spending on education, financial literacy, and employment rate on literacy outcomes. This approach provides a rigorous means of testing the hypotheses and examining how changes in the independent variables impact the literacy rate over time.

The formula used for multiple regression is as follows:

$$Y=\beta0+\beta1X1+\beta2X2+\beta3X3+\beta4X4+\epsilon$$

Where:
Y = Literacy rate (dependent variable) (% of people ages 15-24),
X1 = GDP per capita,
X2 = Government Expenditure on Education (percentage of GDP),
X3 = Government Expenditure on Education (percentage of government expenditure)
X4 = Employment Rate (Employment to population ratio),
ε = Error term,
β0 to β4 = Coefficients representing the effect of each independent variable.

Participants

As this is a secondary data study, the "participants" are the datasets obtained from the World Bank, specifically from 2000 to 2023. These datasets provide extensive information on Pakistan's GDP per capita, government spending on education, financial literacy indicators, employment rates, and literacy rates. The study exclusively focuses on Pakistan to provide a targeted analysis of the country's education system in relation to its economic and social factors.

Research Instruments

The primary instruments in this research are the World Bank datasets, which include data on the following:

Literacy rate: Youth literacy rate is the percentage of people ages 15-24 who can both read and write

with understanding a short simple statement about their everyday life.

GDP per capita (Gross Domestic Product) values for Pakistan from 2000 to 2023: GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current U.S. dollars.
Government Expenditure on Education as a percentage of GDP: General government expenditure on education (current, capital, and transfers) is expressed as a percentage of GDP. It includes expenditure funded by transfers from international sources to the government. General government usually refers to local, regional and central governments.
Government Expenditure on Education as a percentage of tota, government expenditure: General government expenditure on education (current, capital, and transfers) is expressed as a percentage of total general government expenditure on all sectors (including health, education, social services, etc.). It includes expenditure funded by transfers from international sources to the government. General government usually refers to local, regional and central governments.
Employment Rates for Pakistan: Employment to population ratio is the proportion of a country's population that is employed. Employment is defined as persons of working age who, during a short reference period, were engaged in any activity to produce goods or provide services for pay or profit, whether at work during the reference period (i.e. who worked in a job for at least one hour) or not at work due to temporary absence from a job, or to working-time arrangements. Ages 15 and older are generally considered the working-age population.

All the aforementioned variables are sourced from the World Bank's database.
The analysis will be conducted using SPSS software for statistical tests, particularly multiple regression analysis. This tool is suitable for handling large datasets and performing sophisticated statistical analyses, including testing for the significance of the relationships between variables.

Missing Values
The datasets with missing values are handled by imputing the mean in place of the missing value.

Procedure
The study follows a structured procedure. First, data will be collected from the World Bank database and cleaned to ensure consistency and completeness. This includes aligning the time periods for all variables and addressing any missing data. Following this, a multiple regression analysis will be performed to assess the relationships between the independent variables and literacy rates. The procedure will also involve testing for multicollinearity and ensuring that the model meets the assumptions required for regression analysis.

DATA Analysis
The analysis uses multiple regression techniques to test the hypothesis that the four independent variables (GDP per capita, Government Expenditure on Education, Financial Literacy, Employment Rate) have an on literacy rates. The model's goodness-of-fit will be assessed using R-squared values, and the significance of each independent variable will be tested using p-values. Additional diagnostics will be performed to check for multicollinearity, autocorrelation, and heteroscedasticity to ensure the robustness of the results.

Ethics and Limitations
The ethical considerations involve ensuring the integrity and transparency of secondary data usage. Since the data is publicly available from the World Bank, there are no issues regarding participant consent. However, the limitations of using secondary data include the potential for missing or incomplete data and the inability to control unobserved variables. Another limitation is that the study

prioritizes solely quantitative factors and does not account for qualitative aspects of educational access and inclusivity, such as cultural or social barriers.

Results and Analysis

Results of Multiple Regression

A multiple regression analysis was conducted using SPSS to evaluate the relationships between the four independent variables and literacy rates.

Dependent Variable: Literacy Rate (Percentage of people aged 15-24)

Independent Variables:

GDP per capita (X1)

Government Expenditure on Education as a percentage of GDP (X2)

Government Expenditure on Education as a percentage of total government expenditure (X3)

Employment Rate (X4)

Model Summary

Refer to Table 1 for the R-squared and adjusted R-squared values, which indicate the proportion of variability in literacy rates explained by the independent variables.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.649[a]	.421	.299	1.589029971	.421	3.450	4	19	.028	2.522

a. Predictors: (Constant), Employment Rate, GExE (GEx), GDP pc, GExE (gdp)

b. Dependent Variable: Literacy Rate

Table 1: Model Summary for Multiple Regression

Interpretation: The R-squared value is 0.421, which indicates that 42.1% of the variance in the literacy rate is explained by the predictors: Employment Rate, Government Expenditure on Education (GExE) as a percentage of GDP (Gdp pc), and total Government Expenditure (GEx). This shows a moderate level of explanation by these variables for literacy rate variations. The adjusted R-squared of 0.299 accounts for the number of predictors, and while slightly lower, it indicates that this model has a reasonable fit for the data.

Furthermore, the Durbin-Watson statistics are 2.522, which is within the acceptable range (1.5 to 2.5), suggesting there is no significant autocorrelation in the residuals of the model. This implies that the model's error terms are independent, reinforcing the reliability of the regression outcomes.

ANOVA Table

Refer to Table 2 for the ANOVA results, which test the overall statistical significance of the model.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	34.847	4	8.712	3.450	.028[b]
	Residual	47.975	19	2.525		
	Total	82.823	23			

a. Dependent Variable: Literacy Rate

b. Predictors: (Constant), Employment Rate, GExE (GEx), GDP pc, GExE (gdp)

Table 2: ANOVA Table for Multiple Regression

Interpretation: The ANOVA table indicates that the F-statistic is 3.450 with a p-value of 0.028. Since this p-value is less than 0.05, it confirms that the model is statistically significant at a 5% significance level. This suggests that the independent variables collectively have a significant effect on literacy rates, and the regression model fits the data well.

Coefficients of the Variables

Refer to Table 3 for the coefficients of the independent variables, along with their corresponding p-values and confidence intervals.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	86.653	38.519		2.250	.037	6.032	167.275					
	GDP pc	.001	.001	.235	1.070	.298	-.001	.004	.411	.238	.187	.632	1.581
	GExE (gdp)	3.024	1.876	.427	1.612	.123	-.902	6.951	-.058	.347	.281	.434	2.302
	GExE (GEx)	-.802	.286	-.719	-2.808	.011	-1.399	-.204	-.463	-.542	-.490	.464	2.153
	Employment Rate	-.295	.768	-.082	-.383	.706	-1.902	1.313	-.198	-.088	-.067	.670	1.493

a. Dependent Variable: Literacy Rate

Table 3: Coefficients Table

This table shows the relationship between the dependent variable (Literacy Rate) and independent variables.

(Constant): The intercept of the regression model, showing that when all predictors are zero, the Literacy Rate is 86.653.

GDP per capita (B = 0.001, p = 0.298): The coefficient suggests a small positive impact of GDP per capita on Literacy Rate. However, the p-value (>0.05) indicates that this relationship is not statistically significant. H0 is not rejected for this variable.

GEXE (GDP) (B = 3.024, p = 0.123): This coefficient shows a positive relationship between government expenditure on education (as a percentage of GDP) and literacy rate. However, the p-value shows that this relationship is not statistically significant, so H0 is not rejected.

GEXE (GEX) (B = -0.802, p = 0.011): The negative coefficient indicates that a higher percentage of government expenditure allocated to education is associated with a decrease in Literacy Rate. This is statistically significant ($p < 0.05$), so H3 is accepted, and H0 is rejected.

Employment Rate (B = -0.295, p = 0.706): This shows a very weak negative relationship between the Employment Rate and Literacy Rate, but the p-value is far above 0.05, indicating no significance. H0 is not rejected.

Multicollinearity: The VIF (Variance Inflation Factor) values are all below 10, indicating no multicollinearity concerns.

Hypothesis Testing Summary

H1: There is no significant relationship between GDP per capita and Literacy Rate (fail to reject H0).

H2: There is no significant relationship between Government Expenditure on Education (% of GDP) and Literacy Rate (fail to reject H0).

H3: There is a significant negative relationship between Government Expenditure on Education (% of total government expenditure) and Literacy Rate (reject H0, accept H3).

H4: There is no significant relationship between Employment Rate and Literacy Rate (fail to reject H0).

Interpretation of Results

The regression analysis shows that only one of the independent variables, Government Expenditure on Education as a percentage of total government expenditure, has a statistically significant relationship with literacy rates. In contrast, GDP per capita, Government Expenditure on Education

(as a percentage of GDP), and Employment Rate showed no statistically significant effects on literacy rates.

GDP per Capita and Literacy Rate

The results show that GDP per capita has a small positive but statistically insubstantial influence on literacy rates. This implies that economic growth alone does not guarantee improvements in literacy. Although GDP per capita is often associated with better educational access (Haider & Asim, 2020), factors such as inequality, inefficient resource distribution, and regional disparities in Pakistan may limit its influence on literacy outcomes. These findings align with previous studies, suggesting that without addressing structural issues, the benefits of economic growth may not reach educational systems (Ali & Gulzar, 2018).

Government Expenditure on Education (as % of GDP) and Literacy Rate

The results show a positive but statistically insignificant relationship between Government Expenditure on Education (as a percentage of GDP) and literacy rates. This suggests that increasing government spending on education in terms of GDP does not significantly translate into better literacy outcomes. Previous studies (Malik et al., 2020) have suggested that government expenditure alone may not be enough to improve literacy rates without dealing with problems such as inefficient resource allocation, governance, and quality of education infrastructure.

Government Expenditure on Education (as % of total government expenditure) and Literacy Rate

Interestingly, the results indicate a significant negative relationship between Government Expenditure on Education (as a percentage of total government expenditure) and literacy rates. This implies that higher proportions of government expenditure allocated to education may actually be associated with lower literacy rates. This could be due to mismanagement of educational funds, lack of transparency, or inefficiency in delivering educational services (Ahmad et al., 2019). Another explanation could be that as the overall government budget increases, the relative allocation to education becomes less impactful in addressing critical literacy challenges, especially in rural areas (Ansar et al., 2021).

Employment Rate and Literacy Rate

The Employment Rate was found to have no statistically significant relationship with literacy rates. This result is somewhat surprising as it contradicts general expectations that a higher employment rate would correlate with better educational outcomes. However, some studies (Hassan & Rehman, 2022) suggest that this could be due to the informal nature of employment in Pakistan, where many individuals, especially in rural areas, are employed in low-skill sectors that do not require high literacy levels. This draws attention to a need for further research to explore the quality and types of employment in relation to educational outcomes.

Limitations

This study has several limitations:

Financial Literacy: The study did not directly include financial literacy as a variable, though it could be an important factor influencing educational access (Ansar et al., 2021). Future studies could incorporate this variable to examine its effects on literacy rates.

Qualitative Aspects: While the study used quantitative data, it did not account for qualitative factors such as social norms, cultural barriers, or governance issues that might affect educational access.

Data Gaps: Some data points were missing, and the study relied on mean imputation, which could impact the accuracy of the results.

Recommendations for Future Research

- Inclusion of Financial Literacy: Future studies should consider financial literacy as a variable to

better comprehend its function in education. Additionally, examining the role of private sector contributions to education may provide a fuller picture of factors influencing literacy rates.

- Qualitative Research: Incorporating qualitative research could offer a more profound comprehension of the barriers to inclusive education, particularly among marginalized communities.
- Longitudinal Studies: Further research could examine how changes in economic conditions and educational policies over longer periods impact literacy outcomes.

Conclusion

In summary, the results of this study reveal that only Government Expenditure on Education (as a percentage of total government expenditure) has a significant but negative impact on literacy rates in Pakistan. The remaining variables—GDP per capita, Government Expenditure on Education (as a percentage of GDP), and Employment Rate—show no significant relationship with literacy rates. These results highlight the intricacies of addressing literacy through government policy alone and draw attention to the necessity of more thorough approaches that address financial literacy, qualitative social factors, and resource allocation efficiency. Further research incorporating both qualitative and quantitative aspects could offer deeper observations into how to improve literacy outcomes in Pakistan.

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