

Cite this Article: Mushtaq, F., Yousuf, M. I., Parveen, Q., & Bhutta, M. H. (2026). Population Growth and Educational Infrastructure at Primary Level: Challenges and Solutions. *Journal of Regional Studies Review*, 5(2), 11-20. <https://doi.org/10.62843/jrsr/2026.v.ii.204>

RESEARCH ARTICLE

JOURNAL OF REGIONAL STUDIES REVIEW (JRSR)

Population Growth and Educational Infrastructure at Primary Level: Challenges and Solutions

Faiza Mushtaq ^a M. Imran Yousuf ^b Qaisara Parveen ^c Mazhar Hussain Bhutta ^d

Corresponding Author: M. Imran Yousuf; dr.imran@uaar.edu.pk



Abstract: The present study examined the population growth on educational infrastructure at the primary level in public schools of Rawalpindi District. The primary objective of this study was to explore the effects of an increase in the number of students on educational infrastructure and determine the solutions for improving the quality of primary education. Descriptive quantitative research design was adopted in this study. The target population for this study was primary school teachers, students and primary school administrators in Rawalpindi city. A total of 200 participants were selected using purposive sampling technique. These participants included 165 students, 15 teachers and 20 administrators from four public primary schools. Collection of data was done using a structured questionnaire which comprised of 20 questions on Likert scale. The reliability of the measuring instrument was measured using Cronbach's Alpha ($\alpha = 0.825$). The results showed that population increase has led to class overcrowding and increased student enrollments, which have affected teaching efficiency and the academic performance of learners. The teachers noted that class size is a challenge in terms of classroom management, while the administrators pointed out that population increase plays a crucial role in the planning of educational institutions. The students indicated that class overcrowding has affected their participation and learning. Correlation analysis showed positive and statistically significant relationships among teacher perspectives, administrative perspectives, students' learning environments, and proposed solutions. Effective educational planning, expansion of school facilities, recruitment of qualified teachers, policy reforms, and community participation are essential to ensure quality primary education and meet the growing educational demands of the population.

Keywords: Population Growth, Educational Infrastructure, Primary Education, Public Schools, Student Enrollment

Introduction

The foundation of any nation's development is its educational system. As a result, it is critical to provide its citizens with high-quality education so they can contribute significantly to the advancement of their nation. Numerous factors, including a lack of funding, poor management, population growth, the accelerated urbanization process, political unpredictability, ineffective policymaking and more, will have an effect on providing high-quality education in developing countries.

Moreover, the concept of urbanization was born because people moved from the rural to the urban region in search of work. People from rural regions move to the urban region because there are more job opportunities due to the process of industrialization. Therefore, it became easier for people to be urbanized.

^a M.Phil. Scholar, Department of Education, PMAS-Arid Agriculture University, Rawalpindi, Punjab, Pakistan.

^b Professor, Department of Education, PMAS-Arid Agriculture University, Rawalpindi, Punjab, Pakistan.

^c Chairperson, Department of Education, PMAS-Arid Agriculture University, Rawalpindi, Punjab, Pakistan.

^d Chairman, Department of Sociology, PMAS-Arid Agriculture University, Rawalpindi, Punjab, Pakistan.

Urbanization reached its height when many people moved from underdeveloped to developed regions such as cities and towns. When the population of the city increases and the resources are limited, it becomes more difficult to find respectable employment and access to quality healthcare and educational facilities (Boterman, 2019).

A number of factors, including poor supervision, lack of resources for necessary teaching and learning aids, poor organizational structure, poor ability of educators, lack of teacher assistance for the classroom, and lack of a system to measure understudy learning outcomes on unusual subjects related to current societal problems, contributed to Pakistan's inclusive community area's inadequate preparation. For the past few years, the government system's primary objective has been to improve Pakistan's level and kind of readiness. The open plan of basic guidance will be expanded by the Pakistani government. This can be used in government schools. A measure to determine whether they have expanded their range by increasing their enrollment more quickly than the general population has improved. Since it establishes the focus of attention for the capable masses, the basic preparation has been the source of incredible anxiety (Pillay & Shipalana, 2023).

Pakistan's low level of government spending on education is the root cause of inadequate performance in schools. This draws attention to the fact that Pakistan's educational system is insufficiently efficient to set up the necessary facilities, lessen gender favouritism, and improve educational quality. The lack of knowledge about family planning may be the cause of these defects. Despite being in place for over 30 years, Pakistan's family planning strategy has not yet produced the desired results. Despite a decline, fertility rates remain higher than those of some other countries' programs (Chakraborty et al., 2019).

In every nation on earth, the strategies and policies pertaining to the educational system undergo constant reform. The reason for this is that government policies must constantly undergo some modifications and adjustments over time. Pakistan's educational policy has changed frequently over the years, with both positive and negative effects. Scholars in the social sciences have recently conducted research that shows various effects of urbanization and population growth on educational quality (Hussain, 2013).

Any economy needs infrastructure to expand. Human survival now depends on infrastructure for housing, education, healthcare, energy, and transportation. A country must have these facilities since they are necessary for both domestic life and economic activity. Infrastructure is necessary to promote economic growth and, in turn, aid in the eradication of poverty, adversity, and economic inequality in a community. The objective is to investigate the empirical relationships among infrastructure, population, and economic growth, of this research. According to some empirical research, infrastructure, population, and economic growth are all positively correlated (Batuo, 2015).

Objectives of the Study

This research has the following objectives:

1. To analyze the role of infrastructure in influencing the quality of education at the primary school level.
2. To examine the relationship between population growth and educational infrastructure.

Research Questions

1. How does infrastructure influence the quality of education at the primary school level?
1. What is the relationship between population growth and the development of educational infrastructure?

Significance of the Study

This research is of high significance as it has to do with the issue of increasing population and its influence on the education process in the schools at the primary level. With the rise in population, there is immense pressure on educational institutes with respect to the availability of classrooms, good teachers, educational

resources, and other such needs. This research will provide significant information concerning the increasing trend as well as its influence on primary education. The findings of this research will be very helpful in understanding the impact of population growth on education and the need for education planning. The results of this research will be very useful for educational policymakers, planners, administrators and authorities in making sustainable ways to improve the educational infrastructure and make sure that primary education is accessible for all children.

Literature Review

The term "population growth" refers to the rising population of a city, province, state, or country. Malthus, Thomas Robert (1766–1834) tackled a number of contemporary issues, including political and economic ones. The phenomenon of excessive population growth is one of the significant issues he highlights. In his "Malthusian theory of population growth" (1798), Malthus outlined his belief that the expanding population poses a threat to society. By analyzing their relationship, he connects the idea of population growth with resources (Lagad, 2020).

Arshad and Washbrook (2025) studied the connection between the increase in enrollments, availability of resources at schools, and academic success of students in Punjab schools. It was shown that the quick rise in the number of students without the proper changes in the infrastructure of the school Population Growth and Development of Educational Infrastructure.

Population Growth and Quality Education: An Empirical Review

The research study "The Consequences of Rapid Population Growth on Human Resource Management" focuses on how population growth affects people's educational attainment in developing nations. "Development: The Education Case." In this paper, the researcher employs empirical research methods to establish an empirical correlation between population growth and education in order to ascertain the impact. This study shows that several theories have a detrimental effect on economic growth because they divert resources, ranging from physical resources such as factories and machinery that raise productivity to human resources that are acquired via education and whose return on investment is low compared to other investments. Schools have spent a lot of money trying to maintain the quality of education because of increasing population. This research collected data from third-world countries in a certain period that felt the effects of population pressure or growth through the provision of educational services. Establishing if population pressures had any effect on human resources growth in terms of education is the main objective of this research (Kelley, 2013). There has been an important study on the relationship Between Population and Education in China conducted by Ding (1983). The relationship between population and education will be affected by constraints on production means. This will affect social development and not influence the process of social development. This study made it clear that the number of learners in schools and the population growth rate are positively related to the level of education development. In this study, much attention is being put on the relationship between education and population structure and social mobility and the relationship between population growth and education. In most cases, an underdeveloped education system and poor education are seen in those countries having high populations. Development of the education system to make this population a quality population is the primary concern for a country with such a large population. But according to this study, the most important step in turning the population into a quality population is to establish and grow a system and structure within the community (Ding, 1983).

Theoretical Concept of Quality Education

Population theory was initially proposed by a German professor, Karl Winkelblech (1810-1865). The second population theory is known as the optimal population theory. This theory is against the Malthusian theory of population. The theory of Optimum population was initially proposed by the professors of the London School of Economics, Edwin Cannan and Carr-Saunders. As per this theory, "In light of natural resources, technology

and capital stock, there can be a particular size of population having income per capita (SyamRoy, 2017). Such a population size that has the highest income per capita is known as the Optimum population. Some researchers have discussed this theory according to their own viewpoints. Some researchers define it as the "boarding" where "a population at which the standard of living is at its highest level." On the contrary, "Car saunders says that optimum population is that which generates maximum social welfare" and "optimum population is that which generates maximum income per capita," according to Dalton & Gregory (2013). As a result, the optimal theory of population growth rests on two important assumptions: the proportion of the working population in the total population remains the same despite the increase in population. Additionally, when there is an increase in population, the population of the country increases, but the natural resources, technical know-how, and capital stock remain constant.

One more significant contribution comes from Ovenden-Hope, Passy, and Iglehart (2023). These authors examined issues related to sustaining the supply of teachers at schools located in isolated locations. They found that disadvantaged and remote areas lack well-educated teachers, thus creating inequalities in terms of educational provision. Therefore, the authors suggested considering demographic and geographical factors when planning the development of educational infrastructure.

Population Growth and Access to Education

As population grows and new settlements are formed, the demand for educational institutions increases. With growing population, there is an increased risk of schools being overcrowded, which makes it difficult for everyone to have access to education, especially in rural communities. This study stressed the importance of developing educational infrastructure parallel to population growth in order to provide equitable access to primary education (Gao et al., 2025).

Challenges Associated With Educational Infrastructure in Pakistan

While there have been advancements in terms of increased enrollment, it is true that there are many educational infrastructure problems associated with Pakistan. It is due to the urban-rural divide, inadequate educational facilities, and inequality of distribution of educational resources that makes the educational system of Pakistan ineffective. This research found that increasing enrollments necessitate the development of infrastructure (Naseem & Naseem, 2026).

School Age Population Growth and Allocation of Educational Resources

Growth of the school age population leads to increased need for educational facilities and distribution of resources. For effective development in education, governments have to make provisions for schools, classroom facilities, and other educational facilities in light of any changes in the demography. This research concluded that an even distribution of resources allocated to primary education was vital for ensuring sustainability in education development. The process of educational planning in relation to demographics will help in this regard (Zhang et al., 2025).

Role of Educational Infrastructure in Population Increase

It is very important for the educational infrastructure to be in place when there is an increase in population in any area. With urbanization and the rise in population, the government needs to make greater investments in schools and classrooms. According to the findings of this study, there are many cases where educational infrastructure development lags behind population increase due to poor planning (Gupta & Das, 2024).

Khan and Tariq (2026) reviewed the School Improvement Project in the primary schools of Chitral in Pakistan. They found that improvement of infrastructure, sanitation facilities, and gender-friendly environments played a key role in the enhancement of enrollment and educational access. Likewise, Michalis Constantinides discussed the issue of education inequality in Scotland, emphasizing that cooperation between schools, communities, and policymakers can help overcome the problem of poor infrastructure and provide educational services to the marginalized population.

Research Methodology

Research Design

This study was descriptive in nature. A descriptive quantitative research design was used in this study to investigate population growth and educational infrastructure at primary level challenges and solutions. The study outlined population growth and experiences regarding educational infrastructure towards public schooling at the primary level. The research described population growth and experiences regarding educational infrastructure, including teaching quality, discipline, communication with the school, and teacher-student ratio. Data were collected through a questionnaire and analyzed using statistical tests. The study focused only on population growth and educational infrastructure in the Rawalpindi district, whose children are enrolled in public primary schools.

Population and Sample

The population of this study consists of primary school teachers, students, and administration. These participants possess direct knowledge and experience regarding the effects of population growth on educational infrastructure at the primary level. They can provide valuable information about issues such as student enrollment, availability of classrooms, teacher-student ratio, school facilities, and the capacity of educational institutions to accommodate the increasing number of primary school age children. The viewpoints of the two experts are indispensable for knowing the effect of population increase on the adequacy and efficiency of educational infrastructure in Rawalpindi. A sample size of 200 individuals was chosen for this descriptive study in order to examine the impact of population increase on educational infrastructure at the primary level in Rawalpindi. There are 231 primary schools for both boys and girls in Rawalpindi. Four public primary schools were chosen using the purposive sampling technique. The sample size comprised 165 students, 15 primary school teachers, and 20 school administrators, thus constituting a sample size of 200 individuals altogether. According to L.R. Gay, the chosen sample size is adequate for descriptive research.

Research Instruments

The tool that was used to gather the required data in this research involved a well-formulated questionnaire containing questions of closed-ended type and those using the Likert scale. This questionnaire was developed in order to get information on the effect that population growth has on the infrastructure of education at the primary school level.

Data Collection

The researcher selected public primary schools in Rawalpindi to collect data for this research study. The type of research conducted was descriptive and quantitative research, which involves studying the effect of population growth on the educational infrastructure in primary-level institutions. In this research, the dependent variable was the educational infrastructure in primary schools, whereas the independent variable was population growth (through an increase in the number of students enrolled in the public primary schools).

Data Analysis

The data obtained from this study were subjected to quantitative statistical analysis. The use of descriptive statistics such as frequency, percentage, mean and standard deviation was carried out in order to describe the responses of the subjects on population increase and provision of education infrastructure at the primary level. Moreover, inferential statistics such as the Pearson correlation test were also employed to analyze the relationship that existed among the study variables, which include teachers' viewpoint, administration's viewpoint, learning environment of students, and solutions to problems. The reliability of the research tool was also determined through the Cronbach's Alpha test.

Ethical Consideration

All ethical considerations were upheld in this research process. Informed consent from participants was obtained. The confidentiality and anonymity of the participants were maintained, and they were allowed to withdraw at any time. No harm was caused to the participants in collecting the data.

Data Analysis and Interpretation

This chapter emphasizes the analysis of the data collected. The researcher has made an in-depth analysis, interpretation, and discussion of the findings and finally comes up with a conclusion and recommendations. The purpose is to analyze the relationship between Population growth and Educational Infrastructure at the primary level of Public Schools. In this chapter, there will be data screening, descriptive statistics, Correlation Analysis and discussion of findings. The data have been collected in a systematic and scientific way and analyzed with the help of SPSS software, assisted with Excel sheets and statistical formulae. Most of the analysis has been done in percentage form.

Analyze the Role of Infrastructure in Influencing the Quality of Education at the Primary School Level

Table 1

Teachers' perceptions regarding population growth and its accommodation

Statement	Mean	Std. Deviation	Interpretation
Population growth has increased the number of students per classroom.	3.83	1.289	Agree
Large class sizes negatively affect teachers' ability to teach effectively.	3.78	1.343	Agree
Access to enough teaching resources is available to meet the needs of all students.	2.89	1.469	Neutral
Administration provides sufficient support to manage growing student numbers.	3.78	1.274	Agree
The school has adequate infrastructure to accommodate the current student population.	3.75	1.198	Agree

The table represents teachers' opinions on teaching challenges due to population growth. The results show that population growth increased the number of students in classrooms, which negatively affects the ability to teach. According to the results, teachers have access to resources, which is neutral, meaning that somehow there is a need for more resources. School Infrastructure is adequate for the current population, and administration is cooperative.

Table 2

Perceptions of Head Teacher regarding Population Growth and its Accommodation

Statement	Mean	Std. Deviation	Interpretation
Every student has access to sufficient desks, chairs, and classroom space.	3.59	1.304	Agree
Learning materials such as books, computers, and teaching aids are sufficient for all students.	3.39	1.206	Neutral
Classroom overcrowding impacts students participation and learning outcomes.	4.07	1.167	Agree
Recreational and play facilities meet the needs of all students.	3.25	1.395	Neutral
Students can receive individual attention from teachers despite large class sizes.	3.38	1.309	Neutral

Teacher training programs are adequate, and population growth is the main factor for enlarging school space, like classrooms and other facilities. There is a neutral response for budget allocation, teacher recruitment and policies that work for addressing challenges.

Table 3
Relationship between Population Growth and Educational Infrastructure

Statement	Mean	Std. Deviation	Interpretation
Teacher training programs adequately prepare me to handle challenges from increasing enrollment.	3.76	1.265	Agree
Population growth is a significant factor in planning new classrooms and facilities.	3.48	1.190	Agree
Budget allocations are sufficient to address infrastructure needs caused by rising enrollment.	3.33	1.264	Neutral
Recruitment of teachers is keeping pace with the growing number of students.	2.86	1.032	Neutral
Policies are in place to address challenges related to population growth in primary schools.	3.24	1.323	Neutral

The findings indicate that respondents agreed that teacher training programs adequately prepare teachers to manage the challenges of increasing student enrollment ($M = 3.76$). They also agreed that population growth is an important factor in planning new classrooms and school facilities ($M = 3.48$). However, respondents were neutral regarding the sufficiency of budget allocations for infrastructure development ($M = 3.33$). They also expressed a neutral opinion about whether teacher recruitment is keeping pace with the growing number of students ($M = 2.86$). Similarly, respondents remained neutral on the effectiveness of existing policies to address population growth in primary schools ($M = 3.24$). Overall, the findings suggest that while respondents acknowledge the importance of teacher preparation and infrastructure planning, they believe improvements are needed in funding, teacher recruitment, and policy implementation to effectively address the impact of increasing enrollment.

Findings of the Study

The outcomes of this research are based on the information gathered from 200 participants comprising students, teachers, and school administrators from the public primary schools in Rawalpindi. This information was statistically analyzed using the SPSS software with descriptive statistics (mean and standard deviation) as well as Pearson correlation analysis. It is clear from the results that population growth greatly affects educational infrastructure at the primary level.

After analyzing the data, the following finding were drawn:

Teachers’ Perceptions regarding Population Growth and its Accommodation

From the teachers' viewpoint, the findings indicate that population growth has brought about an increase in classroom overcrowding with $M = 3.83$ ($SD = 1.289$). Additionally, large class sizes impact adversely on the teachers' teaching efficacy with $M = 3.78$ ($SD = 1.343$). The availability of teaching resources was revealed to be neither positive nor negative with $M = 2.89$ ($SD = 1.469$), which signifies inadequate teaching resources. Administrators' support had $M = 3.78$ ($SD = 1.274$), and the adequacy of school infrastructure scored $M = 3.75$ ($SD = 1.198$).

Perceptions of Head Teacher regarding Population Growth and its Accommodation

From a head teacher's point of view, there was agreement among respondents on the effectiveness of teacher training programs ($M = 3.76$, $SD = 1.265$), while the issue of population growth is important when making plans for expanding schools ($M = 3.48$, $SD = 1.190$). On the other hand, the allocation of the budget was

not sufficient ($M = 3.33$, $SD = 1.264$), the recruitment of teachers did not meet the requirements ($M = 2.86$, $SD = 1.032$), and the policies were also moderately effective ($M = 3.24$, $SD = 1.323$).

Findings related to Correlation Analysis

The findings indicate that respondents agreed that teacher training programs adequately prepare teachers to manage the challenges of increasing student enrollment ($M = 3.76$). They also agreed that population growth is an important factor in planning new classrooms and school facilities ($M = 3.48$). However, respondents were neutral regarding the sufficiency of budget allocations for infrastructure development ($M = 3.33$). They also expressed a neutral opinion about whether teacher recruitment is keeping pace with the growing number of students ($M = 2.86$). Similarly, respondents remained neutral on the effectiveness of existing policies to address population growth in primary schools ($M = 3.24$). Overall, the findings suggest that while respondents acknowledge the importance of teacher preparation and infrastructure planning, they believe improvements are needed in funding, teacher recruitment, and policy implementation to effectively address the impact of increasing enrollment.

Discussion of the Study

The research project has been conducted to identify the correlation between population growth and the infrastructure of educational institutions at the primary level in the public sector schools in the district of Rawalpindi. From the findings, it can be concluded that population growth has caused many problems for the education system, especially regarding the infrastructure, classrooms, and facilities for teachers and administration. With the increase in population growth, there is an increased number of children who require quality education. From the results of this research project, it can be observed that as population growth increases, enrollment in the schools increases. Increased enrollment in the schools leads to the problem of overcrowding of the classrooms along with additional responsibility for the teachers. With an increase in the number of students in the classroom, it becomes very hard for the teachers to pay personal attention to all the students in the classroom. In addition, it is very hard for the teachers to cater to the needs of the students because of a lack of facilities. The study indicated that educational infrastructure is under a lot of strain due to the rising population of students. Though schools have infrastructure facilities available, respondents noted problems with classroom size, educational materials, furniture, and play areas. It can be concluded from these findings that the existing infrastructure is not adequate to cater for the rising number of students. Hence, schools are expected to run on limited resources despite being faced with more students. In terms of education administration, it was found that demographic change has become one of the important factors that influence educational decisions.

School administrators recognized the need for more classrooms, facilities, and educational resources to cater for the increasing population. However, there are some issues connected to funding, recruiting teachers and the implementation of educational policy. These findings show that educational institutions face some challenges in adjusting their infrastructure and educational processes fast enough to changes in demographics. In other words, the development of infrastructure and resources does not always correspond to the increase in the number of students. Besides, it was found that the learning process of the students depends on the presence of educational infrastructure. It is stated that the problem of high population in classes can have negative effects on the level of student involvement in the learning process. Additionally, the lack of resources and insufficient attention from teachers can have some negative impact on the learning process of the students. In addition, correlation analysis proved to be positive and statistically significant for the views of teachers, the administration, the studying conditions for students, and the solutions offered. This means that all these factors are interconnected and very important for the activity of primary schools. It means that improvement of planning and resource provision will ensure the creation of appropriate conditions for studying and teaching.

Recommendations

First and foremost, the government needs to make arrangements for establishing further primary schools in those areas where the population growth is quite fast so that the increasing number of children can be admitted into schools and the problem of classroom overcrowding can be tackled effectively. The existing school buildings need to be expanded by adding new classrooms and improving basic facilities such as furniture, library, washrooms, and playgrounds to ensure that the schools are equipped with the facilities necessary for dealing with the increasing student enrollment. There is a dire need to recruit a sufficient number of qualified teachers to keep the teacher-student ratio balanced and thus allow the teachers to deal with the classrooms in an effective way. The government needs to allocate more budget for primary education so that schools can be adequately funded for their infrastructure development and other educational requirements. Finally, professional development and training programs should be offered to the teachers so that they can cope with large classroom settings and adopt new teaching techniques as well. Educational policies on infrastructure development, enrollment management, and resource management should be well thought out and effective in their implementation, with proper monitoring systems in place to produce results on the ground. Parents and the local community should be actively engaged in school improvement initiatives, as their involvement can help in better school management and dealing with educational problems. A good monitoring and evaluation system should be developed to keep track of the current situation in schools, infrastructure requirements, and enrollment trends so that improvements can be made.

References

- Arshad, S., & Washbrook, E. (2025). The trade-off between enrolment expansion, school resources, and learning outcomes in Punjab's public schools. *Humanities and Social Sciences Communications*, 12(1), Article 1955. <https://doi.org/10.1057/s41599-025-06080-4>
- Batuo, M. E. (2015). The role of telecommunications infrastructure in the regional economic growth of Africa. *The Journal of Developing Areas*, 49(1), 313–330. <https://doi.org/10.1353/jda.2015.0005>
- Boterman, W., Musterd, S., Pacchi, C., & Ranci, C. (2019). School segregation in contemporary cities: Socio-spatial dynamics, institutional context and urban outcomes. *Urban Studies*, 56(15), 3055–3073. <https://doi.org/10.1177/0042098019868377>
- Chakraborty, N. M., Chang, K., Bellows, B., Grépin, K. A., Hameed, W., Kalamar, A., Gul, X., Atuyambe, L., & Montagu, D. (2019). Association between the quality of contraceptive counseling and method continuation: Findings from a prospective cohort study in social franchise clinics in Pakistan and Uganda. *Global Health: Science and Practice*, 7(1), 87–102. <https://doi.org/10.9745/GHSP-D-18-00407>
- Dalton, H., & Gregory, T. E. (2013). The optimum theory of population. In R. J. A. McCulloch (Ed.), *London essays in economics: In honour of Edwin Cannan* (pp. 115–148).
- Ding, S. (1983). On the relationship between population and education. *Renkou Yanjiu*, 6, 18–23.
- Gao, Y., Tian, L., Li, Z., Wang, Y., Huang, A., & He, Q. (2025). The impact of rural settlement expansion on educational accessibility: A patch-scale study based on 2867 Chinese counties from 2000 to 2020. *Humanities and Social Sciences Communications*, 12, Article 1252. <https://doi.org/10.1057/s41599-025-05527-y>
- Gupta, D., & Rani, A. (2024). The economics of education: Investment in human capital and economic growth. *International Journal for Research Publication and Seminar*, 15(2), 45–49. <https://doi.org/10.36676/jrps.v15.i2.07>
- Hussain, A. (2013). Meeting the challenge of demographic change through equitable development. *Population Council Book Series*, 1(1), 69–79. <https://doi.org/10.1002/j.2326-4624.2013.tb00009.x>
- Kelley, A. C. (1993). The consequences of rapid population growth on human resource development: The case of education. In D. A. Ahlburg, A. C. Kelley, & K. O. Mason (Eds.), *The impact of population growth on well-being in developing countries* (pp. 67–137). Springer. https://doi.org/10.1007/978-3-662-03239-8_5
- Khan, J., & Tariq, A. A. (2026). The role of school improvement program in increasing enrollment in primary schools in Chitral. *Research Consortium Archive*, 4(2), 1600–1609. <https://www.rcresearcharchive.com/index.php/Journal/article/view/786>
- Lagad, S. J. (2020). *Malthusian theory of population*. https://www.researchgate.net/publication/344696118_Malthusian_Theory_of_Population
- Naseem, T., & Naseem, R. (2026). Educational inequality and system bottlenecks in Pakistan (2014–2023): Tri-country benchmarking against India and Bangladesh. *Voyage Journal of Educational Studies*, 6(1), 139–156. <https://doi.org/10.58622/rfvphd75>
- Ovenden-Hope, T., Passy, R., & Iglehart, P. (2023). Educational isolation and the challenge of “place” for securing and sustaining a quality teacher supply. In I. Menter (Ed.), *The Palgrave handbook of teacher education research* (pp. 163–184). Springer. https://doi.org/10.1007/978-3-031-33503-6_9
- Pillay, R. M., & Shipalana, M. L. (2023). The effects of school infrastructure on curriculum policy implementation. *International Journal of Social Science Research and Review*, 6(8), 167–182. <https://doi.org/10.47814/ijssrr.v6i8.1550>
- SyamRoy, B. (2017). *Population studies framework*. Springer. <https://doi.org/10.1007/978-981-10-3156-1>
- Zhang, Y., Yang, W., Li, B., Yang, Y., Chen, L., & Feng, L. (2025). Convergence of primary education development in urban and rural China: Empirical analysis of historical trends and future projections. *Humanities and Social Sciences Communications*, 12, Article 475. <https://doi.org/10.1057/s41599-025-04752-9>