Excel Portfolio Project

1. Introduction

This report provides an in-depth analysis of school data from Punjab, Pakistan, with the goal of guiding a $3 billion investment aimed at improving educational infrastructure, upgradation, and expanding opportunities in rural areas. By analyzing the data provided, we will highlight key areas for investment to ensure the optimal allocation of funds and resources.

2. Dataset Overview

The dataset provided was consisted of detailed information on schools across Punjab, including their basic information, enrollment figures, infrastructure, and teacher's distribution.

Missing data in key fields was filled as NULL. Data manipulation was done across multiple columns to get the proper data to be considered for the Data Visualization.

Multiple new columns were created like Vacant Posts and Teachers and Non Teachers data available per school entity.
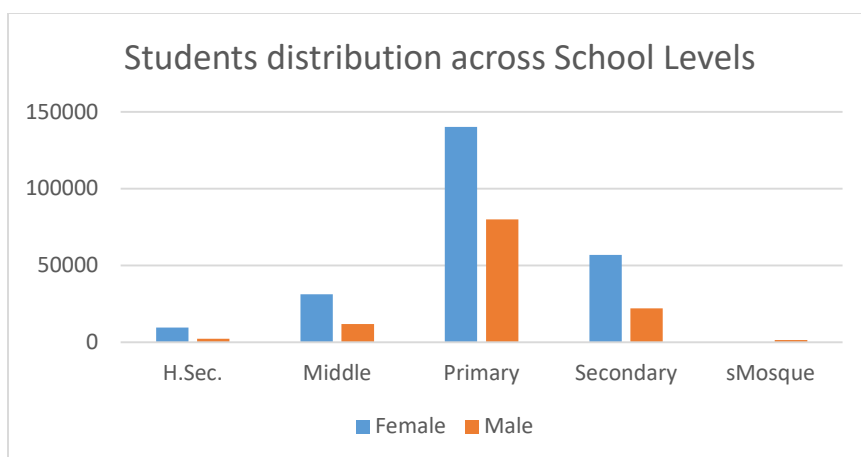
3. Analysis and Key Insights

Total Schools

➢ Punjab has a total of 48191 schools distributed irregularly across rural and urban areas, indicating a need for uniform distribution of resources, infrastructure and teachers especially in underrepresented rural regions.
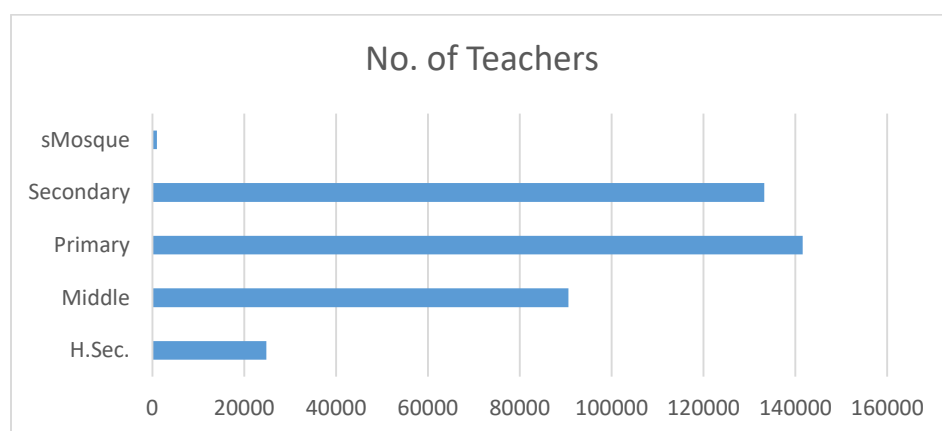
School Gender Distribution and Low Enrollment

➢ Schools established in the 2000s show a significant gender gap, with male students making up only 36% of total enrollment in rural areas. This highlights the need for gender-specific educational initiatives in rural regions to increase male participation. Female enrollment has been outnumbering the male students in every level of school except for the sMosque.

Students distribution across School Levels

A bar chart titled "Students distribution across School Levels" showing Female (blue) and Male (orange) students across categories H.Sec., Middle, Primary, Secondary, and sMosque. Y-axis ranges from 0 to 150000. Primary has the highest with Female around 140000 and Male around 80000.

Top 5 Districts for Teachers

> The districts of Faisalabad, Rawalpindi, Sargodha, Rahim Yar Khan and Lahore have the highest number of teachers, reflecting a strong teaching presence.

> However Chiniot, Hafizabad, Pakpatan, Lodhran and Rajanpur show a shortage, suggesting the need for targeted recruitment and teacher training programs.

> Teachers distribution is across school levels also shows a significant gap, as Higher Secondary and Middle schools are far behind than Secondary and Primary schools in term of teachers available across the province. This suggest to increase hiring for Higher secondary and middle schools to maintain the teacher's distribution, as showed in the graph below.

No. of Teachers

A horizontal bar chart titled "No. of Teachers" showing teacher counts for sMosque, Secondary, Primary, Middle, and H.Sec. X-axis ranges from 0 to 160000. Primary has the highest around 142000, Secondary around 134000, Middle around 90000, H.Sec. around 25000, and sMosque very small.

Enrollment by District and Level

> High enrollment in districts such as Rahim Yar Khan at the primary level suggests a strong demand for education; however, the transition to secondary and higher secondary schools is low. This indicates the necessity of constructing more middle and high schools in Rahim Yar Khan, particularly in rural areas where 80% of the students are enrolled across multiple school levels. As

shown in the chart below, there are very few secondary schools as compared to the primary schools in rural areas whereas in the urban areas, secondary schools take a lead to primary schools meaning students are bound to move to urban areas for higher education. Being a backward area, majority left the education as they do not have funds to move for education.
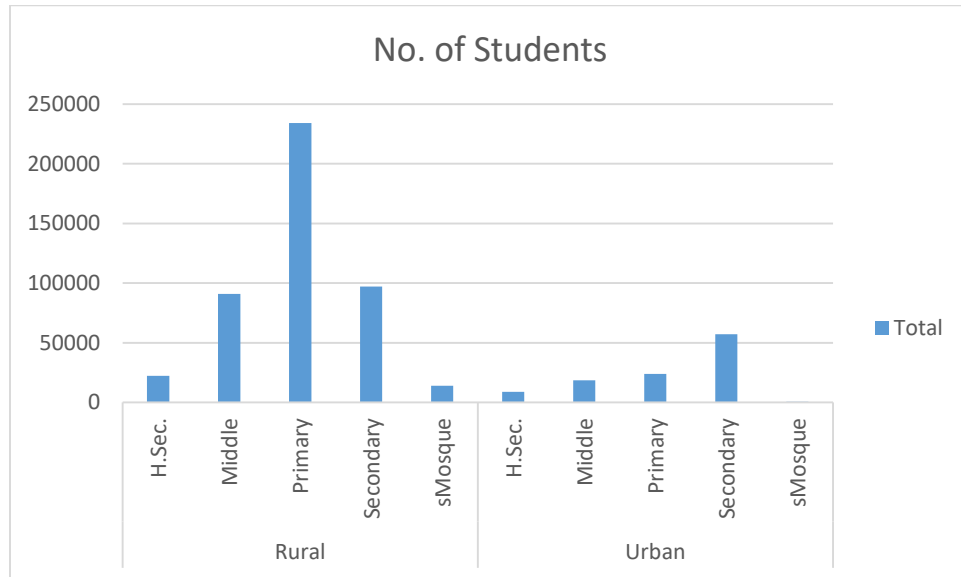
Rural vs. Urban Schools

➢ Only 31% of schools in urban areas offer dual-medium education (Urdu and English), only 18% of rural schools provide similar access. This gap points to the need for expanding educational access in rural regions to include diverse language instruction, ensuring equal opportunities. As shown in the chart below, in rural areas government lack both English and Dual-Medium schools.
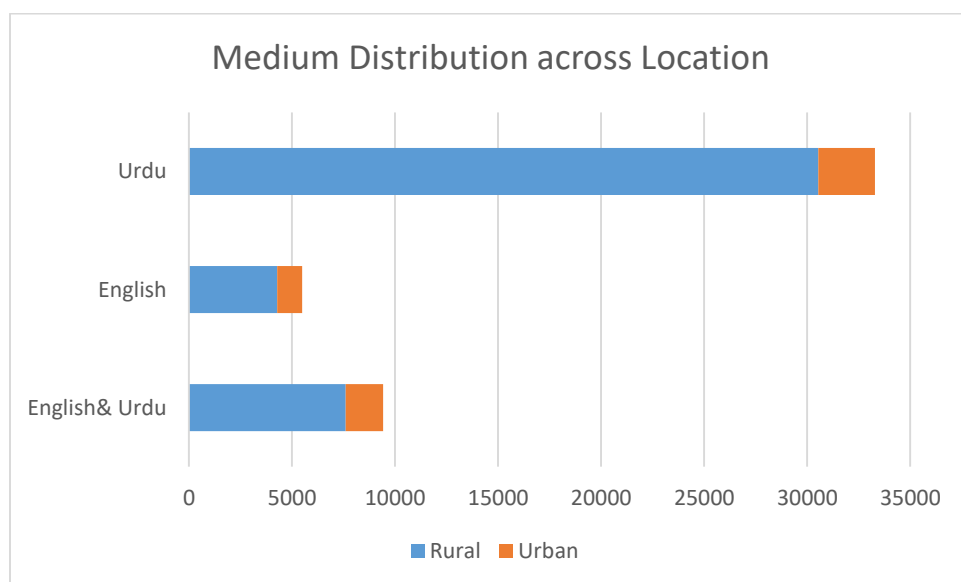
Building and Facility Conditions

- According to the data provided, 75% schools in the province have satisfactory building conditions with just 70% schools with proper security measures.
- Schools in D.G Khan, Rajanpur, Rawalpindi, Mianwali and Bahawalnagar show the least availability of drinking water facilities particularly at the secondary level, emphasizing the need for clean drinking water and water filtration plants in these particular districts.
- Schools in Bahawalpur, Rahim Yar Khan, Rajanpur, Bahawalnagar and Muzaffargarh have some of the least electricity availability, with only 65% having proper electricity arrangements in urban areas. Addressing these basic needs should be a priority in infrastructure upgrades.
- Schools in Bhakkar, Kasur, Nankana Sahib, Chiniot and Lodhran has drastic conditions if it comes to the availability of toilets. Bhakkar with just 26% availability of toilets in the schools is the worst in the list with Lodhran at number 5 with just 68% of schools with toilets. A special fund should be allocated to these districts as not having toilets is a huge problem for both students and teaching staff.

4. Justification for Fund Allocation

- **School Level Upgradation (10 million Rs):**

  Upgrading schools, especially in Rahim Yar Khan, Rajanpur and Hafizabad where secondary school enrollment is low, would enable a smoother transition from primary to secondary education, helping retain students.

- **Infrastructure (5 million Rs):**

  Allocating funds to districts such as Bahawalnagar, Rajanpur, Bhakkar, Kasur and D.G Khan, which lack basic infrastructure like boundary walls, electricity and toilets, will provide a safer and secure learning environment.

- **Facilities (2 million Rs):**

  Addressing the lack of drinking water and playgrounds in districts such as Bahawalnagar, D.G Khan, Rajanpur, Mianwali, Muzaffargarh and Bahawalpur will improve students' overall well-being and encourage attendance.

➢ **Rural Schools (20 million Rs):**

Building new middle and high schools in rural areas, especially in Rahim Yar Khan, Rajanpur, Chiniot, Hafizabad and Mandi Bahauddin will provide students with accessible education close to home, reducing dropout rates, particularly for male students.

➢ **New Primary Schools (10 million Rs):**

 Establishing new primary schools in underserved areas like Mandi Bahauddin, Jhelum, Lodhran, Nankana Sahib and Chinot will help reduce overcrowding and ensure the early access to education for all children.

5. Data-Driven Marketing Strategies

For the marketing section, align strategies with the identified needs:

➢ Target Rural Communities:
Launch campaigns that focus on expanding access to middle and high schools in rural areas, where the gender gap is widest. Use local radio, community events, and digital platforms to raise awareness about new schools being built.

➢ Highlight Infrastructure Improvements:
Use before-and-after success stories to highlight improvements in school infrastructure, such as classrooms, toilets, and boundary walls. Show how these changes improve student outcomes and safety, particularly in districts like [district names].

➢ Leverage Technology for Promotion:
Promote the company's technological solutions that enhance learning environments through modern facilities, such as digital labs and smart classrooms, especially in urban areas.

6. Conclusion

This report analyzes educational data from Punjab, Pakistan, to guide a $3 billion investment aimed at improving school infrastructure and expanding opportunities, particularly in rural areas. The dataset reveals a total of 48,191 schools, with significant disparities in resource distribution between urban and rural regions.

Key insights highlight a gender gap in enrollment, particularly in rural areas where male participation is notably low. The analysis identifies a shortage of teachers in districts such as Chiniot and Rajanpur, necessitating targeted recruitment and training efforts. Furthermore, high primary enrollment in districts like Rahim Yar Khan contrasts with low secondary admission rates, indicate to a need for more middle and high schools.

Facility conditions vary widely, with many schools lacking essential resources such as drinking water, electricity, and adequate sanitation. To address these issues, the report proposes specific allocations: upgrading schools, improving infrastructure, enhancing facilities, and building new schools in underserved areas.

Marketing strategies are recommended to promote educational initiatives, focusing on rural communities and highlighting infrastructure improvements. Overall, the report underscores the urgent need for targeted investments to ensure equitable access to quality education in Punjab.