

# Education Market Research & Segmentation Report

India, 2015–16

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**Project Report**

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# 1 Introduction

Education is a foundational driver of socio-economic development in India. However, persistent disparities across regions and gender remain major barriers to universal access and learning outcomes. This study focuses on the 2015–16 education landscape with the goal of understanding:

- Geographic disparities in literacy and enrollment,
- Gender differences in participation,
- Infrastructure and teacher availability as key enablers,
- Systemic challenges in elementary (Grades 1–8) and secondary (Grades 8–10) education.

These insights can guide policymakers, NGOs, and education planners to design targeted interventions where the system lags the most.

## 2 Dataset Overview

Two state-wise datasets are considered:

### 1) Elementary Education (Grades 1–8)

Includes number of schools, teachers, Pupil–Teacher Ratio (PTR), Gross Enrollment Ratio (GER), and Gender Parity Index (GPI). This captures the foundational schooling ecosystem.

### 2) Secondary Education (Grades 8–10)

Includes enrollment disaggregated by gender, GER, GPI, number of schools, and key facilities. This captures the transition into higher grades and early dropout pressures.

## 3 Geographic Analysis

Education outcomes exhibit strong regional clustering.

### High-performing states

**Kerala:** Literacy  $\sim 94\%$ , PTR  $\sim 19$  (better than a national average near 30), GPI  $\sim 1.0$  (gender parity), and GER  $\sim 98\%$ . **Tamil Nadu** and **Himachal Pradesh:** Literacy  $\sim 80\text{--}86\%$ , comparatively stronger infrastructure and teacher availability, and smaller gender gaps.

### Low-performing states

**Bihar** and **Uttar Pradesh:** Literacy  $\sim 61\%$  (Bihar) and  $\sim 69\%$  (UP); PTR often  $> 40$ ; GPI  $< 0.8$  at the secondary level; GER  $< 75\%$ . **Rajasthan:** Literacy  $\sim 66\%$  with significant gender gaps.

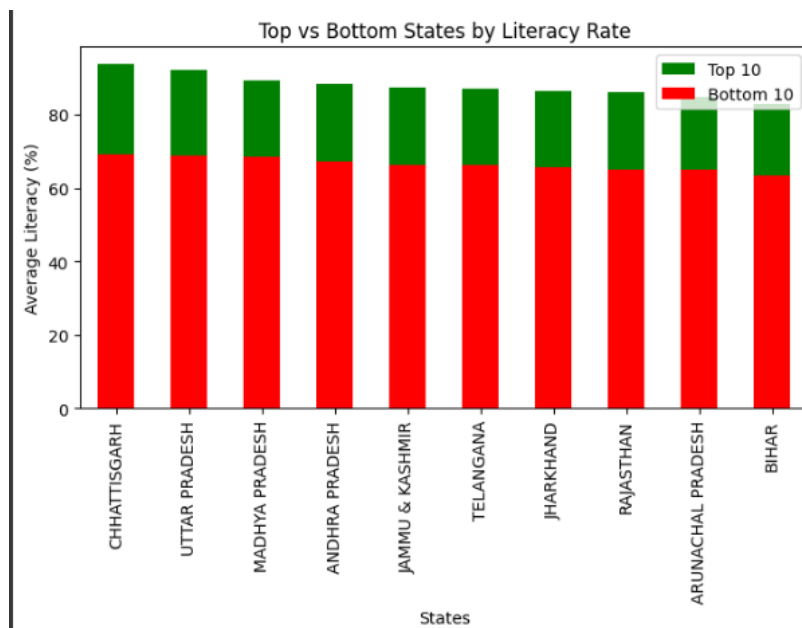


Figure 1: Southern and western states perform better, while northern and eastern states struggle.

## 4 Literacy Rate Analysis

**Range of literacy:** Highest in Kerala ( $\sim 94\%$ ), Himachal Pradesh ( $\sim 86\%$ ), Maharashtra ( $\sim 82\%$ ); lowest in Bihar ( $\sim 61\%$ ), Rajasthan ( $\sim 66\%$ ), Jharkhand ( $\sim 67\%$ ). **Gender gaps in literacy:** Kerala (Male  $\sim 96\%$ , Female  $\sim 92\%$ ; gap  $\sim 4\%$ ), Bihar (Male  $\sim 71\%$ , Female  $\sim 51\%$ ; gap  $\sim 20\%$ ), Rajasthan (Male  $\sim 80\%$ , Female  $\sim 57\%$ ; gap  $\sim 23\%$ ).

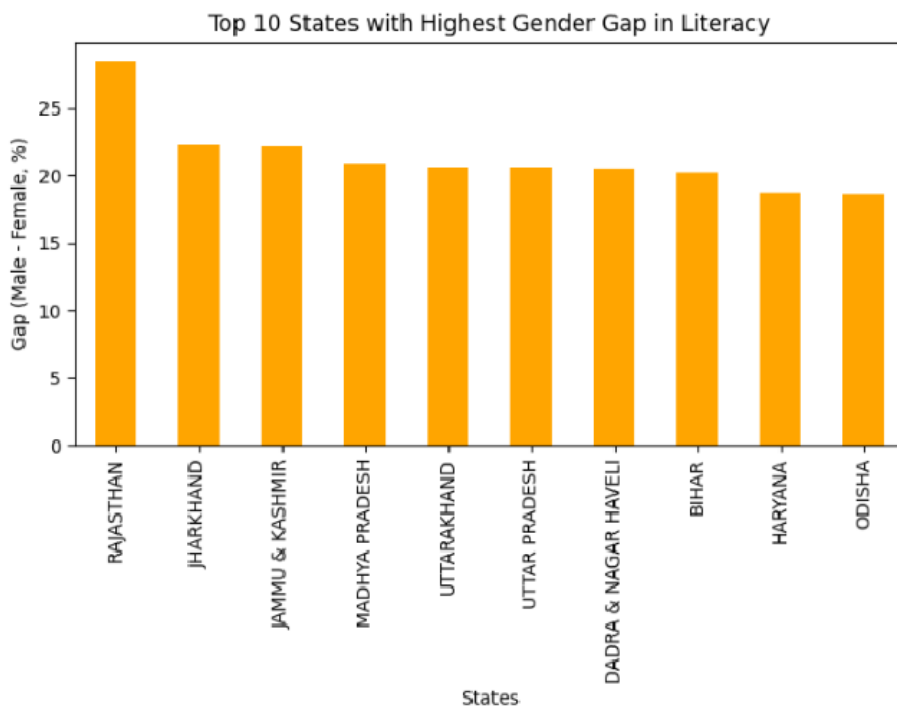


Figure 2: A bar chart of male vs female literacy across states would show that female literacy lags more in low-literacy states.

## 5 Gender Segmentation

At the elementary stage (Grades 1–8), most states approach parity (GPI  $\sim 0.95$ – $1.0$ ), e.g., Kerala (1.0), Tamil Nadu (0.98), and Maharashtra (0.97). This suggests that government schemes such as the *Sarva Shiksha Abhiyan* and *Midday Meal Programme* have been successful in improving access and enrollment for girls in the early years of schooling.

At the secondary stage (Grades 8–10), girls' participation drops sharply: Bihar (GPI  $\sim 0.74$ ), Rajasthan (GPI  $\sim 0.78$ ), and Uttar Pradesh ( $< 0.80$ ). The decline is linked to several factors:

- **Social norms:** Early marriage, domestic responsibilities, and safety concerns limit girls' mobility.
- **Infrastructure:** Lack of functional toilets, safe hostels, and reliable transport disproportionately affects adolescent girls.
- **Economic constraints:** Families in rural and low-income areas often prioritize boys' education when resources are limited.

The data clearly shows that while parity is being achieved at the primary stage, systemic barriers re-emerge in adolescence, preventing a smooth transition to higher levels of education. Figure 2 reinforces that gender inequality in literacy and enrollment is widest in states already struggling with low literacy rates.

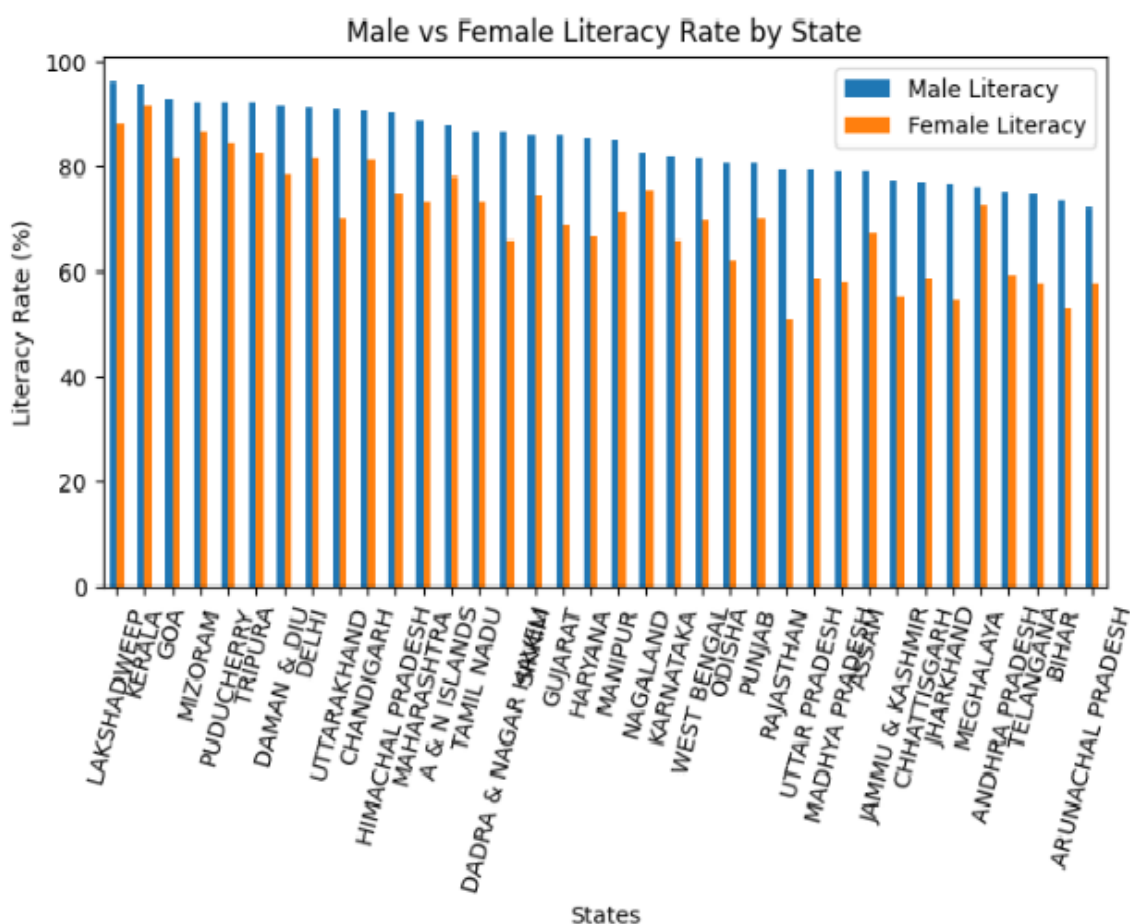


Figure 3: Line graph showing GPI from elementary  $\rightarrow$  secondary education (steep decline in poorer states)

## 6 Infrastructure & PTR Analysis

Infrastructure and teacher availability are key drivers of learning quality and retention. States with better facilities and lower PTR consistently report higher literacy and enrollment outcomes.

### PTR (Pupil–Teacher Ratio)

The national average PTR is around 30, but there are stark regional differences:

- **Low PTR (positive):** Kerala and Himachal Pradesh (~19–22) allow for personalized attention and better learning outcomes.
- **Moderate PTR:** Tamil Nadu and Maharashtra maintain PTR in the mid-20s, balancing student numbers and teacher availability.
- **High PTR (critical):** Bihar, Uttar Pradesh, and Jharkhand often exceed 40, leading to overcrowded classrooms, teacher fatigue, and limited student engagement.

As shown in Figure 3, states with very high PTR values correspond closely with lower literacy and higher dropout rates. This highlights the urgent need for targeted teacher recruitment and deployment in high-burden states.

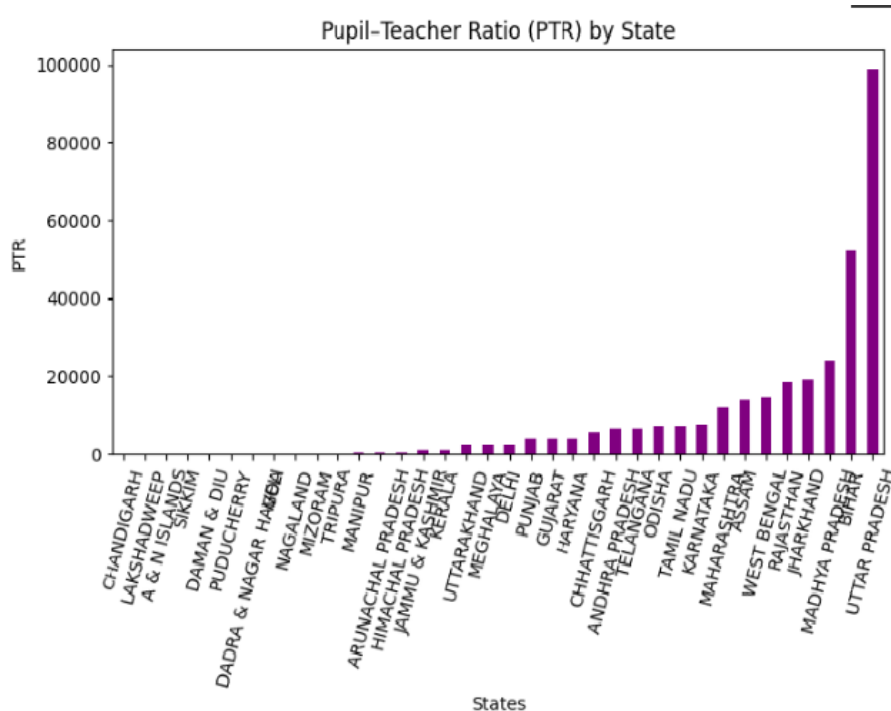


Figure 4: Lack of infrastructure correlates with higher dropout rates, especially for girls at secondary level.

### School Infrastructure

Beyond PTR, physical facilities shape access and retention:

- **Toilets and sanitation:** Many rural schools still lack functional girls' toilets, discouraging adolescent girls from continuing beyond elementary education.
- **Hostels and transport:** Lack of residential facilities and safe transport disproportionately impacts students in remote villages, especially girls.

- **Learning resources:** Libraries, laboratories, and ICT infrastructure remain concentrated in urban areas, deepening the rural–urban divide.

## Implications

Poor infrastructure and high PTR not only affect enrollment but also learning quality. Students in overcrowded classrooms are less likely to achieve grade-level competencies, and inadequate facilities amplify dropout risks. Addressing these gaps requires both resource allocation and stronger accountability in implementation.

## School Infrastructure

Southern states report higher shares of functional facilities, hostels, and libraries. Many northern states lag, especially in girls’ toilets and hostels.

## 7 Key Insights

1. **Regional imbalance:** Southern and western states outperform northern and eastern states, highlighting uneven policy implementation and socio-economic conditions.
2. **Widening gender gap at secondary:** Girls face greater barriers continuing beyond Grade 8, as seen in states like Bihar and Rajasthan where GPI drops significantly.
3. **PTR and infrastructure matter:** Overcrowded classrooms and inadequate facilities strongly correlate with lower learning outcomes and higher dropout, particularly among rural students.
4. **Socioeconomic overlap:** Low-literacy states frequently align with lower income, rural-heavy demographics, and higher child labor incidence.
5. **Literacy vs. gender parity link:** States with higher literacy rates (Kerala, Himachal Pradesh) also tend to have higher Gender Parity Index (near 1.0), suggesting literacy progress and gender equity reinforce each other.
6. **Dropout hotspots:** Secondary-level dropout rates are highest in Bihar, Uttar Pradesh, and Rajasthan, often linked to poverty, early marriage, and lack of transport/hostel facilities.
7. **Infrastructure gaps are gendered:** Lack of functional girls’ toilets and safe hostels disproportionately reduces female retention, even in states with improving enrollment at the elementary level.
8. **Teacher shortage concentration:** PTR analysis (Figure 3) shows that shortages are concentrated in populous northern states, where demand for teachers far exceeds supply.
9. **Policy replication opportunity:** Best practices from Kerala and Tamil Nadu—community engagement, effective teacher deployment, and strong public-school investment—can inform strategies for lagging states.
10. **Urban–rural divide:** Urban schools generally report better infrastructure, qualified teachers, and higher retention, whereas rural schools face compounding challenges of access and quality.

## 8 Recommendations

1. **Targeted interventions in lagging states:** Focus resources on Bihar, Uttar Pradesh, Jharkhand, and Rajasthan, where literacy rates, PTR, and GPI indicators are the weakest.

2. **Infrastructure upgrades:** Ensure every school has functional girls' toilets, adequate classrooms, libraries, hostels in rural areas, and safe drinking water facilities. This is essential for both retention and equity.
3. **Teacher recruitment and training:** Prioritize hiring in states where PTR > 40, while also ensuring continuous professional development. Incentives (financial and housing) should be offered for postings in rural, tribal, and conflict-prone regions.
4. **Girls' retention measures:** Expand scholarships, free transport, midday meals, and community awareness campaigns. Introduce bridge programs for girls who drop out due to family or social obligations.
5. **Challenging social norms:** Launch campaigns to delay early marriage, reduce child labor, and raise awareness about the value of girls' education. Leverage local leaders and women's self-help groups for grassroots influence.
6. **Technology integration:** Use digital platforms, low-cost tablets, and mobile apps for supplementary learning, especially in rural and underserved areas. Promote blended learning models to address teacher shortages.
7. **Public–Private Partnerships (PPPs):** Encourage corporate CSR initiatives and NGOs to co-invest in school infrastructure, teacher training, and digital learning content, complementing government efforts.
8. **Monitoring and accountability:** Implement transparent, real-time monitoring systems for attendance, PTR, and infrastructure using technology dashboards. Strengthen school management committees to improve accountability.
9. **Vocational and life-skills education:** Introduce vocational training and life-skills courses at the secondary level, especially for girls, to reduce dropout rates and improve employability.
10. **Equity-focused funding:** Allocate additional funds based on indicators such as literacy gaps, PTR, and gender disparity rather than applying uniform funding. This ensures resources are concentrated where the needs are greatest.

## 9 Conclusion

India's schooling system (2015–16) shows progress alongside deep inequality. Kerala, Tamil Nadu, and Himachal Pradesh offer models with high literacy and gender parity, while Bihar, Rajasthan, Uttar Pradesh, and Jharkhand lag due to lower literacy, weaker infrastructure, and entrenched gender bias. Bridging these gaps requires state-specific strategies, sustained infrastructure investment, and social reform focused on girls' participation.

Overall, the evidence highlights that access alone is not enough. While enrollment levels at the elementary stage are encouraging in many states, the sharp decline in girls' participation at the secondary level reveals the social and economic barriers that continue to undermine equity. Figures 1–2 demonstrate that gender inequality remains one of the most pressing challenges, especially in northern and eastern states.

Similarly, teacher shortages and high Pupil–Teacher Ratios (Figure 3) severely constrain learning outcomes. Investments in recruiting and training teachers, particularly in rural and underserved areas, are crucial. Infrastructure deficits — such as lack of functional toilets, hostels, and safe transport — disproportionately affect girls and must be prioritized to improve retention.

The regional variation also suggests that best practices from high-performing states like Kerala and Tamil Nadu could be adapted to low-performing regions. Strong community engagement,

inclusive policy frameworks, and continuous monitoring of gender and equity indicators will be essential for sustainable progress.

Looking ahead, India's education strategy should focus not only on expanding enrollment but also on ensuring quality, inclusiveness, and continuity across all grades. Addressing social norms that discourage girls' education, leveraging technology for equitable access, and ensuring adequate resource allocation will together determine whether the country can move from uneven progress to universal achievement in education. .