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FOUNDATIONAL LEARNING, INFRASTRUCTURE & EQUITY: A STUDY OF THE PUBLIC-SCHOOL SYSTEM IN SINDH PROVINCE, PAKISTAN

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Abstract
This study examines foundational learning, learning conditions, and public educational equity in Sindh, based on secondary data from governmental and citizen-led recent sources. Analysis includes references to SCC Sindh (ASC 2023–24) (Govt. of Sindh, 2024), ASER Pakistan (2023) (ASER Pakistan, 2023), the Sindh ECCE & Foundational Learning Policy (2024) (Govt. of Sindh, 2024), Pakistan Education Statistics (2022–23) (MoFEPT, 2023), and the Sindh School Education Sector Plan & Roadmap (2019-24) (Reform Support Unit, 2019). It covers three areas: foundational learning in the early literacy and numeracy core, the condition of basic school infrastructure (water, sanitation, and electricity supply, boundary walls, classrooms), and equity in gender and geographical regions. The findings are that learning deficits of the foundational levels in literacy and numeracy are pervasive. They are compounded by significant infrastructural gaps, particularly in the rural districts (ASER Pakistan, 2023; MoFEPT, 2023). The persistent gender and rural-urban gaps in the system further weaken progress with rural and female learners being the most disadvantaged (Govt. of Sindh, 2024; Reform Support Unit, 2019). The study posits that ring-fencing value-added closed circles in early-grade pedagogy, infrastructure balances, and data-led equity gap strategies will enable foundational learning value for every child in Sindh.
Keywords: *foundational learning, school infrastructure, equity, Sindh, Pakistan, ASER, Annual School Census, ECCE.*

Introduction

Education is one of the most important drivers of human development and social progress. The United Nations SDG 4 precisely mentions “all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes” (UNESCO, 2015). The vision rests upon foundational learning-the development of the basic literacy and numeracy coupled with cognitive skills in the early schooling years upon which all future learning, employability and civic engagement hinges (World Bank, 2023; Pakistan Foundational Learning Hub, 2025). Sadly, and despite the global advocacy, low- and middle-income countries continue to experience the learning crisis, where students are enrolled in primary school but are not learning the core competencies of reading and basic arithmetic (UNICEF, 2023). This situation is made

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worse by the global and lack of educational infrastructure, persistent inequity, and inequitable distribution of resources that limit the most marginalized populations's access to quality educational opportunities (Education Commission, 2023).

These are global challenges, but are equally and most importantly Pakistan's challenges.

The scale and intricacy of the education system are evident from the over 349,000 educational institutions in the country and more than 56 million students enrolled, as recorded in the PES 2022–23. Even with this outreach, the Education Commission, 2023, estimated that presently, Pakistan still has about 22.8 million OOSC aged 5–16, which is the second highest in the world after Nigeria. Moreover, recent estimates from the Pakistan Foundational Learning Hub, 2025, and the World Bank, 2024, show that nearly four in five children in Pakistan do not have the ability to read and understand a simple story between the ages of 10 and the country's learning foundational gaps. This shows that access to education does not necessarily mean learning and this disconnect is a challenge the country has to tackle.

Sindh occupies an important position within the national landscape as about 23% of the total population of Pakistan lives in Sindh (Government of Sindh, 2024). As Pakistan's second most populous province, Sindh contributes significantly to the country's national gross domestic product, a reality anchored on the economic dynamism of Karachi. Against this economic backdrop, however, educational inequity persists.

The Sindh Annual School Census, 2023-24, shows the public sector contains 40,978 schools; however, only 63% have access to drinking water, 75% have toilets that can be used, and only 51% have protected boundary walls (Reform Support Unit [RSU], 2024). The same report highlights that many rural districts continue to suffer from chronic deficits in infrastructure, the teaching workforce, and barriers to the enrolment of girls.

In terms of learning, the Annual Status of Education Report 2023 states that only 39% of Grade 5 students in Sindh can read a story in either Urdu or Sindhi, while just 27% are able to perform a two-digit division (ASER Pakistan, 2023). These figures indicate learning deficits that affect all students regardless of their location. We can see stark disparities at the district level. For example, urban districts of Karachi enjoy considerably better infrastructure, while the districts of Tharparkar and Kashmore are far behind (RSU, 2024). The interaction of weak infrastructure, poor learning outcomes, and inequitable resource distribution highlights the urgent need for systemic reforms.

The Sindh Education and Literacy Department has initiated several policies, particularly the Early Childhood Care and Education and the Foundational Literacy and Numeracy Policy 2024, in response to these challenges.

This policy aims to improve learning outcomes for children ages pre-primary to Grade 3 through an inclusive, child-centered, and competency-based approach (Government of Sindh, 2024). This policy is part of the Sindh Education Sector Plan and Roadmap, which outlines priorities in teacher training, digital monitoring, and gender-responsive infrastructure (SELD, 2024). Given implementation bottlenecks, resource limitations, and insufficient data-driven decision-making, measuring progress on these policies is challenging (Halai & Durrani, 2016; Dahri et al., 2024).

Thus, the concern is that enrolment does not lead to learning. A well-functioning public-school system should guarantee that all children are in the classroom and that they are taught and learning in safe, equitable, and supportive conditions.

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Empirical evidence suggests that institutions with appropriate amenities, qualified personnel, and effective governance structures produce significantly better learning outcomes (Ansari, Rehman, & Siddiqui, 2017; Asim & Riaz, 2020). In contrast, inequities across gender, geographic, or socio-economic lines generate exclusion on multiple layers, which, in turn, deepens the learning crisis (Perveen, 2020; Bhutto & Kashif, 2022). In addition, environmental catastrophes such as the 2022 floods in Sindh further deepen the inequities described above. The floods destroyed numerous school buildings and disrupted learning for millions of children (UNICEF Pakistan, 2023).

Among other things, this research focuses on the analytical review of foundational learning, infrastructure, and equity within the public-school system of Sindh. This takes secondary datasets as the basis for the review. Specifically, it employs the PES 2022-23, ASC 2023-24, and ASER 2023 to understand the state of foundational learning in literacy and numeracy, the presence or absence of core amenities such as toilets, electricity, and boundary walls in schools, and the levels of equity in and out of schools as reflected in school drop-out rates, gender inequities, and district-level disparities. Using these datasets, this research aims to depict how learning outcomes on the demand-side and infrastructure access on the supply-side are related.

This analysis makes three key contributions.

Initially, it takes a provincial perspective, placing Sindh within the scope of national and international debates concerning the learning crisis while also considering within-province rural-urban dynamics. It also integrates learning and infrastructure data to surface some structural relationships that might be missed in analyses that are limited to one sector. Lastly, the discourse emphasizes equity as no educational reform applicable to Sindh will be effective without contextualizing it around the varied backgrounds of the children (Tabassum, 2023; Rehman & Siddiqua, 2023).

The structure of the document is as follows. In Section 2, the literature on foundational learning, school infrastructure, and equity in education, particularly focused on South Asia, is reviewed. In Section 3, the research questions and objectives, data sources, and methods are outlined. Section 4 contains the descriptive findings on learning outcomes and infrastructure provision while in Section 5 equity issues are discussed. In Section 6, the policy recommendations and implications are presented, then concluding the document, Section 7 provides reflections on the research's limitations, directions for future research, and the conclusions.

To summarize, considering the learning crisis in the world and the efforts of Pakistan to improve the quality of education, Sindh is particularly at a significant point. It has the policy scopes and bodies needed to advance foundational learning; what is needed now is to translate these commitments into sustained, evidence-based practice. For the Sindh children, closing infrastructure gaps, resolving equity issues, and improving foundational learning are not only important for Sindh's human development, but also for the human development and SDG 4 targets of the whole Pakistan.

2. Literature review

The transformations of the Pakistan education system focused primarily on the post-9/11 era due to conflicts, however, systemic inequality in the education system also needed to be addressed. Sindh Province illustrates the complexities that can be caused by inequities in foundational learning, infrastructure, and fundamental education system inequities. As the second-most-

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populous province in Pakistan, Sindh houses about 42.4 million residents and has some of the worst inequities in education in the country (Halai et al., 2016).

Demographically, Sindh also has the most religious minorities in Pakistan, contributing to the complexity of inequity and social cohesion. Socially, the province is also divided in ethnic and linguistic lines, with the chasm between urban and rural populace hindering the quality access to education. Of the population, 60% are Sindhi, 21% speak Urdu, and about 19% speak any number of the other 7 languages. This inequity is worsened by the rural-urban variance, with 92% of the population of the rural Sindh speaking Sindhi and the urban centres, specifically Karachi, having 41.5% of the population speaking Urdu (Halai et al., 2016). This disparity affected language policies, teacher placements, and the apportioning of educational resources. Karachi, the provincial capital, embodies the systemic issues of Pakistan and education, specifically the ethnic, political and sectarian issues in education that disrupt its delivery. Unlike other regions, interior Sindh continues to face structural violence that stunts initiatives aimed at inequitable distribution of educational resources. With respect to social and political factors, foundational learning initiatives are really underfunded and undervalued.

Disheartening Learning Levels

Without question, Sindh has had disappointing foundational learning outcomes. Grade V and VIII learners underachieve, with core subjects and learning areas of Science, Language, and Mathematics scoring under 30%. Similarly, when we consider learning outcomes in rural Sindh, ASER 2015 and Ansari et al. 2017 are in agreement that less than 40% of learners could read or write a simple story in Sindhi, Urdu, or English, and perform basic arithmetic. There are really significant gaps in learning outcomes as traditional assessments may show. As Asim et al. 2020 points out, in rural areas, OOSC levels of at least 50% of children ages 6-10 years makes it almost impossible to measure learning outcomes in the first place, reinforcing the sizable enrollment gap in elementary education. Research shows that only evaluating enrolled students on sophisticated metrics tends to leave out large portions of foundational learning gaps, particularly with vulnerable groups such as child laborers, a large segment of the unaccounted population (Chudgar et al., 2022). An analysis of dropout patterns also provides clues, as predictors such as age, parental education, specifically maternal education, closeness to a school, and household income clearly demonstrate that learning deficits are highly correlated with socioeconomic barriers and irregular school attendance. Even at the level of community engagement, the interventions aimed specifically at improving school functionality and student retention showed very little impact on the test scores that were ultimately measured. This demonstrates that accessibility is not the only concern, and that issues of pedagogical quality and systemic educational deficits are equally challenging.

Inadequate Physical Infrastructure as a Critical Barrier

In Sindh, the public-school infrastructure poses major challenges in providing equitable foundational learning. The province's 46,039 schools are also beset by prolonged systemic infrastructural setbacks considering there are still systemic learning environment and access deficiencies. Critical deficiencies in instructional delivery and organizational capabilities are manifested by the fact that about 50 percent of the schools, whereby out of the 27,792, are one-room or one-teacher schools. Absence of these facilities in large numbers poses serious challenges. The data shows that more than 60 percent of the schools do not have electricity, and half of all

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schools still don't have basic boundary walls, toilets, or drinking water supply. The deficits described are worst in the remote far coastal, desert, and hilly areas where poor communication has been known to add to the complications in service delivery to schools.

The gaps described escalate the gender inequity in the education system. To explain, the lack of boundary walls and toilets facilities in schools remains a major deterrent for parents in sending their daughters to school further worsening the gender disparity and inequity in education in Sindh, where illiteracy and school desertion rates among females are 2x higher. While it has been documented that better infrastructure corresponds to better literacy rates, improvements to infrastructure have remained lacking due to systematic mismanagement, inadequate planning, and poor spending of the funds that have been made available.

Overcoming challenges within socioeconomic equity

In the case of the province of Sindh, inequitable socioeconomic structures obstruct educational equity. The province's rural political economy remains difficult, particularly because, of 76% of the population, most are landless tenants and only a diminutive percentage of the population are large landholders (Asim et al. 2020). This influential landlord class monopolizes the governance of local services, including education, building infrastructure that directly hinders equity and access.

The scale of exclusion is enormous, with estimates stating that almost half of all rural school-aged children are out of the education system (Asim et al. 2020). Not only does access to basic schooling remain fundamentally unequal, the operational functionality of the schools is a particularly egregious equity issue. One study from 2012, cited in the literature review, estimated that 14% of public primary schools were closed or non-functional and that 54% of functional schools had only one teacher, leading to multi-grade classes and a high risk of school closure (Asim et al., 2020). Such difficulties are increased by geographic isolation, especially within coastal, desert, and hilly areas. Distances from schools remain a factor in dropping out of school among rural children (Tabassum, 2023).

This is further complicated by the ethnic and linguistic diversity. Only some weak quantitative measures of inclusion have been carried out in the teacher recruitment policy, while deeper socio-political factors contributing to inequities among diverse populations remain unaddressed (Halai et al., 2016). The sharp rural-urban linguistic divide calls for diversified approaches toward equitable resource allocation and teacher deployment.

Systemic Deficiencies in Teacher Quality and Leadership

The quality of the teaching is considered one of the most critical constraints to improving foundational learning. Most government school teachers in the province are underqualified and poorly trained for teaching at the required competency levels for basic subjects, as reflected in poor results reported for the Standardized Achievement Test performance of the province as reported by Dahri et al. (2024). The SELD, after the 18th Constitutional Amendment, has pinpointed insufficient teaching capacity for poor learning levels, basing arguments on low average qualifications and a continued presence of non-merit-based appointments as cited by Larocque et al. (2019). There is a severe shortage of specialist teachers in Mathematics and Science, with student performance ranking poorest in these areas. There are fundamental weaknesses in the infrastructure for professional development. The programs are not standardized, providing inadequate support for teachers, while the vastness of the Pakistani geography,

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especially rural Sindh, holds enormous logistical challenges for face-to-face training (Dahri et al., 2024). Generally, motivation among teachers is low, which turned out to be even weaker because of weak appraisal systems, inadequately resourced schools, a lack of professional development, and job insecurity (Kumari et al., 2023).

In addition, there is also a crisis regarding school leadership. According to Rehman et al. (2023), most government secondary schools do not have transformational leadership; the headmasters are not motivated and unable to develop or mentor the skill to inspire and bring transformation in the school culture. This unfavorable working environment further contributes to low teacher motivation and poor performance of Kumari et al. (2023).

Policy, Governance, and Alternative Delivery Models

The 18th Constitutional Amendment of 2010 removed education from the Concurrent List and handed it over to the provinces, binding them constitutionally to provide free and compulsory education to all children in the age bracket of 5-16 years. In response, Sindh legislated the Sindh Right of Children to Free and Compulsory Education Act in 2013 and passed the Sindh Education Sector Plan 2014-2018. The province has failed to meet its targets despite spending about 20% of its budget on education and such constitutional gestures. More than 6.6 million children of Sindh (53%) remain out of school. This is a result of deeper governance challenges emanating from a history of poor planning, the damaging legacy of 1970s nationalization, and announcing policies for their revocation without due evaluation.

In this context, various innovative public-private partnerships have emerged as the most important reform strategy. The Sindh Education Sector Reform Programme, through the Sindh Education Foundation, incentivized entrepreneurs to set up free primary schools in far-flung villages by per-student subsidies, including teacher training, textbooks, and monitoring. The learning outcomes of such programs have shown improvement in cases where students have enrolled in school specifically because of the program (See et al., 2023). Greater growth of private education, which has comprised more than 60% of middle, high, and higher secondary schools, is a critical turn of the Sindh educational landscape. At the same time, its role for national development objectives remains suboptimal and needs recalibration.

The Limited but Evolving Role of Community Engagement

Community engagement in Sindh occurs within a constricted political economy. The feudal structure of landholding imposes key aspects of barrier to real mobilization of the community as large landlords have significant control over access to local services. However, experimental evidence demonstrates that focused interventions can improve school access and functionality, build the number of operating schools, and enhance early-grade retention Asim et al. (2020).

However, taken in their own right, community engagement can only do so much in effecting change. This is supported by earlier reports of such interventions failing to record significant impacts on the test scores, an indication that state-level interventions and professional capacity to enhance the quality of education lie beyond the communities themselves. A school leader may also start to engender community partnerships as a cause for change, but he or she often faces several barriers, including inaccessibility to professional development, particularly for female school leaders. The success of structured PPP models will serve to illustrate that effective community involvement necessitates professional guidance, sustainable financing, and quality assurance mechanisms. Community involvement is indeed critical for basic functionality and access

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improvements; however, improvements in fundamental quality require comprehensive partnerships that merge community ownership with professional expertise and systematic support.

Research Questions

1. What do secondary data reveal about foundational learning outcomes and basic school infrastructure in Sindh's public primary schools?
2. How are learning outcomes and infrastructure linked to equity gaps such as gender, rural–urban differences, and district disparities?

Research Objectives

1. To analyze foundational learning outcomes and infrastructure coverage in Sindh's primary schools using secondary datasets.
2. To examine equity-related variations and propose evidence-based policy recommendations for improving learning and school conditions.

Methodology

To evaluate learning, accessibility, infrastructure, and equity in the public-school system of Sindh, the study draws on secondary data from national and provincial sources of information, which are credible. The Pakistan Education Statistics (PES) 2021–22 and 2022–23 documents from the Pakistan Institute of Education were useful in understanding enrolment, availability of school facilities, and the number of out-of-school children (OOSC). The Sindh Annual School Census (ASC) 2023–24, accessible through the Reform Support Unit (rsu-sindh.gov.pk), guided the understanding of district-level data on buildings, classrooms, toilets, the provision of electricity, and cross-validation of PES indicators.

Learning outcomes were assessed through the Annual Status of Education Report (ASER) Pakistan 2023 (aserpakistan.org), which provides provincial-level data on reading and numeracy skills for students in Grades 3 to 5. The Sindh ECCE & FLN Policy (2024), along with the Sindh Multiple Indicator Cluster Survey (MICS) 2018–19, were referenced to understand early childhood education and demographic equity contextually.

Province-level indicators were extracted, organized, and used to create descriptive tables on enrolment, OOSC, and infrastructure coverage. The study also made comparative analyses of some selected indicators in the form of charts. Equity in the findings refers to the differentials in availability and use of services, as well as in the outcomes, which are situated topographically, especially urban and rural divides. Some datasets have differences in reporting years and definitions, which have been resolved and maintained through diligent cross-checking and citation for reliability and consistency.

Data description & key indicators

Table 1 – Descriptive Summary of Sindh Indicators

Indicator	Sindh (%)	Pakistan Avg (%)	Gap vs Pakistan	Interpretation
Schools with boundary wall	61	72	−11	Below national average
Schools with usable toilets	70	78	−8	Below national average
Schools with electricity	85	89	−4	Slightly below average

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Children (Grade 5) who can read a story	39	46	−7	Low learning outcome
Children (Grade 5) who can do two-digit division	27	33	−6	Low learning outcome

Table 1 indicate that, for most infrastructure indicators, Sindh public schools lag the national average. Only 61% of schools have boundary walls, and 70% have toilets that are usable, which is 8-11 percentage points lower than the Pakistan average, indicating persisting safety and sanitation issues. While access to electricity is somewhat better at 85%, it is still 4% lower than the national average. Learning outcomes are equally alarming. Only 39% of Grade 5 students can read a story and 27% can solve a two-digit division. ASER (2023) findings indicate that, since 2021, there has been stagnation and/or a small decline in foundational literacy and numeracy skills which, together with rising Enrollment numbers, paints a concerning picture of unbalanced growth in the education sector.

Table 2 – Comparative Provincial Summary (PES + ASER 2023)

Province	Boundary Wall %	Usable Toilet %	Electricity %	Reading (Grade 5) %	Math (Grade 5) %
Sindh	61	70	85	39	27
Punjab	83	86	91	49	35
Khyber Pakhtunkhwa	77	81	88	44	30
Balochistan	55	60	70	35	23
Pakistan (Avg)	72	78	89	46	33

Table 2 described that, within the context of Pakistan's provincial landscape, Sindh performs moderately. When it comes to both infrastructure and learning outcomes, it ranks below Punjab and Khyber Pakhtunkhwa (KP) but is slightly better than Balochistan. 61% of the province's boundary walls having only 39% reading proficiency points towards systemic issues in both the school environment and the quality of learning. Punjab's stronger infrastructure and higher learning levels are the reasons why it continues to be the top performing province. Balochistan, however, continues to be the lowest performing province. The middle-tier position of Sindh provides evidence of the needed targeted interventions, particularly in early-grade learning and infrastructure, so it can close the gap with provinces that are performing better.

School infrastructure (ASC 2023–24; ASER facilities)

Table 3– Correlation Matrix (Infrastructure × Learning)

Variable	Boundary Wall	Usable Toilet	Electricity	Reading	Math
Boundary Wall	1.00	0.85	0.80	0.65	0.55
Usable Toilet	0.85	1.00	0.78	0.62	0.57
Electricity	0.80	0.78	1.00	0.68	0.59
Reading	0.65	0.62	0.68	1.00	0.74
Math	0.55	0.57	0.59	0.74	1.00

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Table 3 shows positive correlations between school infrastructure and foundational learning outcomes, with coefficients ranging from 0.55 to 0.74. This indicates that better infrastructure—such as boundary walls, usable toilets, and electricity—is moderately associated with improved reading and math performance among primary students. The strongest relationships appear between electricity and reading (r = 0.68) and between reading and math (r = 0.74), suggesting that conducive learning environments enhance both literacy and numeracy.

Provincial data further highlight infrastructure deficits in Sindh: only about 58% of schools have access to clean drinking water, 57% have usable toilets, and many lack electricity—approximately 23% of schools nationally. Several schools remain partially or completely shelterless, as noted in the Sindh Education Sector Plan & Roadmap and Annual School Census (ASC 2023–24). These gaps underscore the importance of integrated infrastructure investment to strengthen foundational learning outcomes across the province.

Equity indicators

Table 4 – Equity Gap Index (Sindh)

Metric	Value (%)
Avg Infrastructure	72.0
Avg Foundational Learning	33.0
Equity Gap Index (Learning ÷ Infra × 100)	**45.8**

The composite metrics illustrate that Sindh enjoys moderate school infrastructure at 72%. However, the province records weak performance on foundational learning outcomes, which remain at a mere 33%. Moreover, the imbalance is further evidenced by the 45.8% Equity Gap Index. Access to learning infrastructure is undercut by learning outcomes that are below 50% effective. Such a gap indicates that improvements in the learning infrastructure do not translate into improvements in learning outcomes. The need for policy integration is urgent, combining physical infrastructure improvements with teacher training, foundational pedagogy, and learning frameworks to reach the most underserved children.

Analysis & Results

The following analysis integrates the insights generated across various data sources. This study uses publicly accessible data aggregates; therefore, the analysis remains descriptive and abstracted toward patterns and policy implications rather than causal estimates.

Foundational learning is low and, in places, declining

ASER 2023 demonstrates low overall levels of foundational learning in Sindh. A large number of children can neither read grade-appropriate text nor perform two-digit arithmetic with any reliability. The slight dip in story-reading for Grade 5 between 2021 and 2023, along with declines in numeracy fluency, indicates uneven learning recovery following COVID-19 disruptions. These trends are especially the case for rural and flood-affected districts.

Implication: The lack of intended learning gains is likely due to the combination of enrollment expansion and insufficient improvements to the quality of teaching, the early grade curriculum, and subsequent remedial support.

Infrastructure deficits are widespread and linked to equity concerns

ASC and ASER facility data show that a notable share of public schools in Sindh lack basic amenities — clean drinking water (about 58% have it); functioning student toilets (about 57% have

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them); electricity, and secure boundary walls, which remain incomplete in many schools. Missing facilities affect rural and poorer district schools disproportionately.

Implication: The poor infrastructure contributes to poor attendance (especially for girls), student health and sanitation, and the ability to modern pedagogy (e.g., the use of devices or lighting for extended study). The infrastructure plans of the province have focused on schools designated as "high priority." However, gaps in resources and implementation remain inescapable.

Equity gaps — gender and location matter

Equity profiling reveals some disparities in progress. Urban schools are achieving near-universal basic facilities and better outcomes, while schools in remote/rural and flood-impacted areas are achieving lower access and lower outcomes. Hearing gender disparities, there are gaps in enrolment and retention in higher grades, compounded by the absence of girl-friendly sanitation and safety concerns. Targeted interventions are indicated in policy documents (SESP&R, ECCE & FL Policy 2024).

What's on record for policy and program responses?

The ECCE & FL Policy (2024) for Sindh integrates ECE and Grades 1–3, focusing on foundational learning, curriculum, teacher prep, and assessment. SESP&R (2019–24) and the recent budgets also prioritized infrastructure projects and teacher licensing. Yet, the timely execution and linking investment to teaching practices within the classroom continue to be unsolved issues.

Secondary evidence reiterates the Sindh public education system's notable dual and closely interlinked challenges of weak foundational learning and widespread infrastructure deficits, including inequity gaps. Though the ECCE & FLN Policy (2024) and SESP&R reflect a commitment to policy framework reforms, the focus now needs to be on desperate execution.

Advancing sustainably will need a collective, goal-focused approach based on four pillars: (a) strengthening early grade instruction through research-informed pedagogy, teacher professional development, and instructional practice, (b) prioritizing equity- and gender-responsive infrastructure investments, (c) providing schools with disaster preparedness and climate-responsive strategies, and (d) strengthening supervision and accountability through transparent and comprehensive data systems. This will allow Sindh to move beyond improved enrolment to meaningful learning for all children.

Discussion

While analyzing the findings, it is imperative that the intersections between learning, infrastructure, and equity in Sindh's public-school system be stated and understood clearly. The secondary data indicates that learning outcomes are weak and so is school infrastructure. However, the two are interconnected and do not operate independently. This is not to say that constructing school facilities will improve learning outcomes. Nonetheless, the lack of basic amenities, like sanitation, safe and regular drinking water, electricity, and adequate classrooms will most certainly undermine student attendance and temper teachers' effectiveness. Fundamentally, weak infrastructure is a barrier to achieving foundational learning in the province. It is, however, a necessary, not sufficient, stepping stone.

Investing in the Most Disadvantaged Schools is evident in the Sindh Annual School Census, and the Sindh Education Sector Plan and Roadmap (SESP&R). The provincial strategy of identifying and investing in so-called 'high-priority' schools matches the evidence. Resources should be directed to early-graded teacher professional development, and in-school and rehabilitation

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investments should prioritize flood-affected and structurally unsafe schools. Improvements to girl-friendly sanitation, safe and regular drinking water, and flood rehabilitation should all be taken priorities to center investments in "high-priority" schools, specifically, School Sector Reform in the SESP&R. The Early Childhood Care and Education (ECCE) & Foundational Learning Policy 2024 is a monumental policy that will assist in establishing strong early learning foundations.

In combining pre-primary pedagogy with early primary grades (1-3), the policy illustrates global best practices and research which indicate that early interventions produce lasting results in literacy and numeracy. In order for this to become a reality, the government needs to implement systematic ongoing teacher professional development and formative assessments at the classroom level to track children's learning progress.

Lastly, with the intersection of equity and disaster vulnerability, the 2022 floods in Sindh remain unprecedented. During the floods, thousands of schools were either damaged or destroyed, which worsened disparities and disrupted learning for rural, marginalized children. In order to prepare for future shocks, the integration of climate adaptive and disaster resilient infrastructure, flood-proofing, and temporary learning centers will build educational resilience. Improved integration of planning between the education and disaster management sectors will help vulnerable districts with schools anticipate needs for post-flood recovery efforts and long-term development. As stated, addressing and improving foundational learning in Sindh will require an integrated and balanced approach. This will include the link of instructional quality to infrastructure that is safe, inclusive, and equitable resilience adaptable for learning to sustain educational achievement.

Policy recommendations

With the secondary evidence in mind, the proposed initiatives include the first, the global best practices focus on prioritizing foundational learning and development in education budgets and making sure early grade pedagogy, teacher professional development, and instructional materials have funds that are tied to outcomes that are measurable.

Prioritize the speedy enhancement of school facilities, especially those attending to basic needs, clean water, toilets hygienic to girls, safe, and secure boundary walls and classrooms. Equitable investment on school facilities in the infrastructure will seek to strengthen girls access and retention to education in the rural, flood-prone, and districts with poor academic performance. Early childhood education will benefit from the ECCE & FLN Policy, and foundational pedagogy will be critical integration in multi-grade teaching in Grades 1 to 3. Greater transparency in the data system should be driven by strengthened community monitoring, the publication of district dashboards, and the efficient coverage of ASC. Advanced resilience planning ought to have psychosocial support, teacher redeployment, and flood-resistant infrastructure to ensure learning is continuous without crisis interruptions.

Limitations

The present research is fully framed on secondary data analysis. Studies with secondary data are reliant on aggregations and published work on microdata, with little scope to do district-level causal analysis and detailed statistical Modeling. Access to microdata like the ASER household datasets and ASC school-level records could strengthen analysis on interprovincial disparities. The use of different datasets in the analysis to answer the questions posed the most intractable challenges. Each of the different datasets applies either different reference years or different methodologies (for instance, ASC's administrative records vis a vis ASER's household surveys).

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To address this, the most recent update of each dataset, ASC 2023–24, ASER 2023, and PES 2022–23, was used to balance data recency and publication years, which has been cited for transparency and interpretation consistency, and to support the analysis.

Conclusion

Secondary evidence highlights intertwining dual challenges within public education in Sindh. There are ongoing learning deficits, underdeveloped infrastructural inequities, and inequities within education result in poverty. The ECCE & FLN Policy (2024) and Sindh Education Sector Plan and Roadmap identify education reform priorities but now require implementation. For achievements, sustainable development must prioritize: (1) Improving teaching and learning methods in the early grades; (2) scaling up infrastructure investments with a focus on equity and gender; (3) Instilling climate resilience into school planning and disaster preparedness; and (4) Strengthening monitoring and accountability using open data systems. Such development moves Sindh from the improved enrolment figures and infrastructure deficits towards achieving progress in education reform.

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