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Educational inequality and digital access among students in rural and urban communities

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Abstract
Digital technologies have become central to schooling, yet access to devices, connectivity, and the skills needed to use them remains unevenly distributed between rural and urban communities. This narrative review synthesises recent literature (2023–2026) on how the rural–urban digital divide relates to educational inequality. Evidence was drawn from systematic reviews, large national and international datasets, and global connectivity reports. The review finds that rural students continue to face first-level barriers, including weaker connectivity and fewer resources, but that the divide has increasingly shifted toward second-level differences in digital skills and in the quality and purpose of technology use. Studies from Portugal and Thailand indicate that access alone is a weak predictor of achievement once prior attainment, socioeconomic background, and patterns of use are considered, whereas subject-specific use and school-level ICT quality show more consistent benefits. Survey data from rural India illustrate how near-universal smartphone access can coexist with weak foundational learning. Barriers to implementation include infrastructure quality, affordability, teacher capacity, and limited causal evidence. The paper concludes that policy should move beyond distributing devices toward integrated investment in connectivity, pedagogy, and digital literacy.

Keywords: Digital divide, educational inequality, rural education, urban education, digital literacy, ICT access

Introduction

Digital technology now sits at the centre of how education is delivered, accessed, and assessed. Learning platforms, online assignments, and digital information sources are routine features of schooling, and the pandemic-era move to remote instruction made them essential rather than optional. This shift carries an uncomfortable corollary: when learning depends on technology, unequal access to technology becomes a source of unequal educational opportunity. Geography is one of the most visible lines along which that inequality runs. Global estimates for 2025 indicate that 85 per cent of people in urban areas use the Internet, compared with 58 per cent in rural areas, and that affordability, service quality, and digital skills remain obstacles to meaningful connectivity (International Telecommunication Union [ITU], 2025) [5].

The relationship between the rural–urban divide and educational inequality is, however, less straightforward than headline connectivity figures suggest. As basic access expands, researchers increasingly ask not only who owns a device or can reach a signal, but how technology is used, whether schools and teachers can use it well, and whether access translates into learning. Recent reviews continue to conclude that limited digital access hinders rural students' achievement and participation (Vodopivec, 2025) [7], while analyses of large national datasets suggest that access variables often explain little once background factors are controlled (Beatriz-Afonso & Cruz-Jesus, 2024 [4]; KC et al., 2025).

This paper reviews recent literature to address three questions: how the rural–urban digital divide is conceptualised in education research; what evidence links digital access and use to educational outcomes; and what barriers complicate efforts to close the gap. The discussion spans school and higher education contexts and uses rural India as an illustrative case.

Review Approach

This paper is a targeted narrative review rather than a formal systematic review. Searches were conducted in October 2026 across web-based scholarly and institutional sources, combining terms such as digital divide, rural and urban students, educational inequality, ICT access, digital literacy, and academic achievement. Priority was given to publications from 2023 to 2026.

Three kinds of sources were retained: systematic and literature reviews, large-scale quantitative studies drawing on national or international assessment data, and reports from authoritative statistical bodies. A source was included when it addressed access to, or use of, digital technology in relation to students' educational experiences or outcomes, and when location or socioeconomic status formed part of the analysis. Seven sources met these criteria and are synthesised below. Because the search was not run across multiple bibliographic databases under a documented protocol, relevant studies may have been missed, and the findings should be read as an informed synthesis rather than an exhaustive survey of the field.

Dimensions of the Rural–Urban Digital Divide

Conceptual Foundations: Levels of the Divide

Research commonly separates a first-level divide, concerned with access to devices and connectivity, from a second-level divide, concerned with the competencies that determine how effectively technology is used. This distinction organised the systematic review by Alikhan and Sritharan (2024) [1] of university students' online learning during the pandemic. Following a staged review process, the authors narrowed 190 retrieved records to 11 empirical studies published between 2020 and 2023. They reported that access-related and competency-related difficulties both recurred, and that financial constraints, geographic disadvantage, and weak infrastructure were the main underlying drivers. The ITU (2025) similarly stresses that affordability and digital skills,

not coverage alone, determine whether connection is genuinely meaningful, reflecting a broader move away from a simple connected-versus-unconnected framing.

Access and Infrastructure

At the first level, rural disadvantage is documented across very different settings. Vodopivec (2025) [7] synthesised research on rural schools and concluded that limited or absent digital access consistently undermines academic achievement, reduces classroom participation, and reinforces existing inequalities. Closures during the pandemic exposed weak rural connectivity especially sharply. A systematic review of rural and urban university students reached a parallel conclusion: rural students were more vulnerable during online learning, largely because of poorer access to technological resources and lower-quality connections (Álvarez Álvarez *et al*., 2025). Global data point in the same direction. The urban–rural gap in Internet use remains wide in regions with low overall penetration, and 96 per cent of those still offline live in low- and middle-income countries (ITU, 2025).

Notably, the binding constraint is shifting. Mobile broadband coverage is now nearly universal, yet gaps in service quality and affordability persist (ITU, 2025). For rural students, then, the question is increasingly whether connectivity is fast, reliable, and affordable enough to support sustained learning, rather than whether a signal exists at all.

Digital Skills and Patterns of Use

Even where devices are available, rural–urban differences extend to skills and to the educational value students derive from technology. Alikhan and Sritharan (2024) [1] identify uneven digital competence as a distinct source of disadvantage. Evidence from Thailand's PISA 2022 sample of 8,507 students in 280 schools shows how layered this problem is. Apparent benefits of home and school ICT access shrank once usage patterns and socioeconomic background were accounted for, whereas the quality of ICT access at school consistently predicted higher reading performance. General ICT use, particularly at school, was negatively associated with outcomes, while subject-specific use and digital competence were positively associated; socioeconomic status moderated these relationships (KC *et al*., 2025).

Rural India offers a useful illustration. The 2024 Annual Status of Education Report (ASER) surveyed 17,997 villages in 605 rural districts and found that around 90 per cent of 14–16-year-olds had a smartphone at home, with more than 80 per cent reporting that they knew how to use one (ASER Centre, 2025). Yet foundational learning remained weak: only about half of Grade 5 children could read a Grade 2-level text, and coverage of the survey notes that only about half of adolescents with smartphone access reported using it for learning. Access, in other words, had spread much faster than structured educational use.

Evidence on Effectiveness

The evidence on whether narrowing access gaps improves outcomes is mixed, and the mixture is informative. On one side, reviews of rural schooling and rural higher education associate poor access with weaker achievement and participation (Álvarez Álvarez *et al*., 2025; Vodopivec, 2025) [7]. On the other, analyses of nationwide data suggest that access is rarely the decisive factor. Beatriz-Afonso and Cruz-Jesus (2024) [4] examined national examination results for almost every Portuguese high school student who sat the Portuguese or mathematics exams. Prior academic background emerged as the strongest predictor of achievement in both rural and urban settings; ICT access was statistically insignificant in both, and socioeconomic status did not significantly affect rural students' results. The Thai findings likewise show that crude access indicators lose predictive power once use and socioeconomic background are modelled (KC *et al*., 2025).

These results need not be contradictory. A plausible reconciliation is that the reviews are dominated by settings, notably pandemic remote learning, in which lack of access made participation impossible, whereas national datasets often reflect contexts with relatively widespread basic access, where differences in what students do with technology matter more than whether they have it. On this reading, access is necessary but insufficient: it prevents exclusion without itself generating learning. Evidence on specific interventions is thinner still. The reviews recommend investment in infrastructure, device distribution, teacher professional development, and digital literacy (Alikhan & Sritharan, 2024; Vodopivec, 2025) [1, 7], but the sources examined here mostly report associations and recommendations rather than rigorous evaluations of particular programmes. Claims about what works should therefore be made cautiously.

Barriers and Challenges to Implementation

Infrastructure and affordability remain the most basic barriers. Although coverage has expanded, quality and price gaps persist, and the ITU (2025) reports that a third of economies have yet to reach the Broadband Commission's affordability target. Financial constraints also feature prominently among university students' difficulties in the review by Alikhan and Sritharan (2024) [1], suggesting that cost operates at every educational level.

A second barrier is the gap between access and educational use. The ASER evidence from rural India shows that widespread smartphone availability does not guarantee structured learning (ASER Centre, 2025), and the Thai analysis indicates that undirected, general-purpose use can be unrelated or even detrimental to achievement (KC *et al*., 2025). Shared household devices, limited guidance, and competing leisure uses are plausible contributors, though the sources reviewed do not test these explanations directly.

Third, institutional capacity limits what schools can do. Vodopivec (2025) [7] calls for sustained professional development for teachers as well as learners, and the Thai finding that school-level ICT quality matters points to the importance of well-resourced, well-managed school environments (KC *et al*., 2025). Finally, the research base itself poses a challenge. Much of the evidence is observational, drawn from particular countries or from the exceptional circumstances of the pandemic, which limits causal inference and generalisation. The rural–urban binary may also conceal meaningful variation within each category, including differences among remote, peri-urban, and disadvantaged urban communities.

Discussion and Implications

Taken together, the literature supports a layered account of digital educational inequality. Rural students are more likely

to face weaker connectivity and fewer resources, and these first-level gaps can be decisive when instruction moves online. Beyond that threshold, however, outcomes appear to depend less on possession of technology than on prior attainment, socioeconomic circumstances, digital competence, and the pedagogical purposes technology serves. Digital access is best understood as an enabling condition whose value depends on surrounding supports.

For policy, this implies that device distribution and network expansion are necessary but should not be treated as end points. Investments in connectivity need to prioritise quality and affordability, not simply coverage. They should be paired with teacher professional development, subject-specific digital content, and structured digital literacy programmes, as the reviewed studies recommend (Alikhan & Sritharan, 2024; Vodopivec, 2025) [1, 7]. In contexts such as rural India, where smartphones are already widespread, the priority may be to channel existing devices toward guided learning rather than to add hardware.

For practice, schools can focus on purposeful, curriculum-linked uses of technology and on ensuring that students from disadvantaged backgrounds receive the guidance that more advantaged peers may obtain at home. For research, there is a clear need for rigorous evaluations of interventions, longitudinal designs, and finer-grained measures of access quality and use. Studies that move beyond the rural–urban dichotomy would also help policymakers target support more precisely. Evidence from low- and middle-income settings deserves particular attention, since most of the world's offline population lives there (ITU, 2025).

Conclusion

The rural–urban digital divide remains a real source of educational inequality, but its nature is changing. Connectivity and device gaps still matter, especially where infrastructure is weak, while differences in skills, quality of access, and purposeful use increasingly shape whether technology benefits learning. The recent evidence suggests that closing the divide requires more than supplying devices: it requires reliable, affordable connectivity, capable teachers, and pedagogy that makes digital tools serve learning goals. Future research should test which combinations of these investments most effectively narrow educational gaps between rural and urban students.

References

1. Alikhan S, Sritharan T. Online learning challenges encountered by university students amidst the COVID-19 pandemic: A systematic review of digital divide perspective. Journal of the University Librarians Association of Sri Lanka,2024:27(2):342–377. https://doi.org/10.4038/jula.v27i2.8092
2. Álvarez Álvarez C, del Arco Bravo I, Flores-Alarcia Ò, Ramos-Pla A. Estudiantes universitarios rurales y urbanos y su vulnerabilidad frente a lo tecnológico: Revisión sistemática [Rural and urban university students and their vulnerability with respect to technology: A systematic review]. Educação e Pesquisa,2025:51:Article e279787. https://www.redalyc.org/journal/298/29881643004/29881643004.pdf
3. ASER Centre. Annual status of education report (rural) 2024, 2025. https://ruralindiaonline.org/en/library/resource/annual-status-of-education-report-rural-2024
4. Beatriz-Afonso A, Cruz-Jesus F. Unraveling the myths of rural vs. urban academic achievement drivers. Emerging Science Journal,2024:8(6):2312–2327. https://doi.org/10.28991/ESJ-2024-08-06-010
5. International Telecommunication Union. Measuring digital development: Facts and figures 2025, 2025. https://www.itu.int/itu-d/reports/statistics/facts-figures-2025/index/
6. KC D, KC P, Rado I, Vichit-Vadakan N. Digital inequality and learning outcomes: Evidence from Thailand. Education and Information Technologies. [Add volume, article number, and DOI from the publisher’s page.], 2025.
7. Vodopivec V. Understanding the digital divide: Contributing factors and their negative effects on rural students’ academic performance. Canadian Journal for New Scholars in Education, 2025, 16(2). https://journalhosting.ucalgary.ca/index.php/cjnse/article/view/8143