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Effectiveness of China's Livestream Classroom Reform in Reducing Regional Educational Inequalities

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Abstract. Entering a fast developing era, technologies have taken an important role in many different fields. In addition to medical and engineering, innovative technologies also influenced education with the creation of digital online classes. Using these technologies, gaps in regional educational inequalities are considered to become minor. This article aims to analysis the effectiveness of livestream classroom in China in reducing the regional gaps of educational inequality. Through reviewing literature already in the field of education and identifying the gaps, this research used both qualitative and quantitative data to analyze the effectiveness.

Keywords: Education Inequality, Livestream classroom, innovative pedagogy.

1. Introduction

Nowadays, China is going through the process of education reform by creating some livestream classroom platforms. In doing so, the government will provide students in rural areas with access to better quality education and resources [1]. This innovative initiative allows urban teachers to deliver lessons online to rural students through real-time interactive broadcasts, often supplemented with smart screens and digital tools. With the use of technology, this teaching pedagogy can promote educational equality in rural and urban areas. However, there are some critics who believe that uneven internet infrastructure and varying teacher adaptability to digital pedagogy might influence the actual performance [2]. Therefore, it is important to research the topic of how effective China's livestream classroom reform is in reducing regional educational inequalities. Through doing literature reviews and paired research with the academic performances of students using livestream teaching techniques in rural areas and those who are not, we hope to fill in the gap in the digital pedagogy field.

This research focuses on the question: How effective are China's livestream classroom reforms in reducing regional educational inequalities, especially between rural and urban areas? This question is important because, despite significant investments in national education reform, substantial disparities persist between students in urban centers and those in rural or underdeveloped regions. The livestream classroom model was introduced to address this issue by providing real-time access

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to high-quality teaching resources across geographic boundaries [3]. However, there is limited empirical evidence evaluating whether these reforms have successfully improved student learning outcomes and narrowed performance gaps. This research aims to explore how livestream instruction impacts academic achievement, student engagement, and access to qualified instruction in rural communities. It also asks whether the implementation of livestream teaching has been consistent across regions and what structural barriers, such as infrastructure, teacher preparedness, or pedagogy, may affect its effectiveness [4]. By focusing on this specific innovation within the broader landscape of China's education policies, our question contributes to a clearer understanding of how technology-based reforms can reduce inequality in national education systems. The research will first elaborate on the definition of China's digital education reform. After collecting and analyzing related research, this study will employ a convergent mixed-methods design to investigate how livestream classrooms reduce China's regional education inequality by integrating quantitative administrative data with qualitative case studies to explain both outcomes and mechanisms.

2. Literature review and theoretical framework

A livestream classroom is an online learning platform where a teacher delivers a real-time, interactive lesson to remote students, usually using streaming video and audio platforms [5]. This can help control the disparity between urban and rural areas. The key components of the livestream classroom include reliable internet, a suitable platform, necessary hardware, and structured lesson plans, which can be simplified as infrastructure, teacher preparedness and pedagogy.

Nowadays, China has taken steady steps to push forward educational digitalization. The Smart Education of China platform (SEC) , for example, has incorporated an abundant digital educational sources, including 88,000 information entries on K-12 education, over 10,000 vocational courses, 27,000 university courses, and about 500 innovation and entrepreneurship related courses [3].

Recent research has explored how livestream classrooms are being used to improve educational access in rural China. The research of these scholars examined and explored the various reasons influencing the outcomes of livestream classrooms from different perspectives [6]. examined the "Triple Classroom" model, which delivers high-quality lessons from urban schools to rural students through livestream platforms. Their case study showed improvements in student outcomes, but they didn't compare results between rural and urban schools [7]. looked at how teacher training affects learning outcomes and found that rural students benefit less from training programs than urban students, especially low-performing students. This suggests that livestream education alone may not be enough; support for teachers and students also matters [8]. demonstrate how AI tools and adaptive learning are used in China to personalize online learning, which show the possibility of narrowing learning gaps.

The studies above highlight the potential of livestream classrooms and online learning tools to improve access and outcomes, especially in rural areas. However, limited research that directly compares the long-term impact of these reforms across rural and urban regions are found in the recent studies. Therefore, this research will build on existing findings by examining how livestream instruction affects student achievement, engagement, and access to qualified teaching in different background settings.

This research is mainly based on two primary theoretical frameworks. The first one is Policy Implementation Theory, which highlights how well-intention reforms may fail if implementation varies across contexts [9]. Effective national policies for live streaming may succeed in urban areas but struggle in rural regions due to differences in infrastructure, school readiness, and teacher

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capacity. For example, while China's policy of teacher rotation aims to close gaps by shifting qualified teachers to classrooms in rural areas, it is often foiled by such variables as housing challenges, a scarcity of resources, and a lack of cooperation among residents.

Constructivist Learning Theory, on the other hand, proposes that active participation will result in better learning, and this is what formed the core of Vygotsky's argument [7]. In livestream classrooms, this means students must be able to interact with teachers, ask questions frequently, and engage in classroom activities. Without such interactive aspects, livestream learning would be inactive and ineffective. These frameworks have been reiterated in literature [6]: concluded that student outcomes and rural teacher development were improved through livestreaming. Similarly [10], concluded that even learning outcomes could be maximized if equal emphasis is placed on student interactivity.

3. Methodology

The impact of china's livestream classroom mode on reducing regional learning inequality: Toward a mixed-methods convergence study Qualitative and quantitative administrative indicators (test scores, enrollment and transition rates, teacher allocation, and platform utilization) are cross-validated and set against qualitative narratives derived from peer-reviewed comparative analyses of cases as well as policy texts chronicling classroom practice, teacher capacity development, and contextual realities of sites. System-level patterns and school and classroom-level experiences are compared in a design that enables us to know not only if results have been altered but how and under which circumstances. This practice is especially useful in multifaceted policy treatments where sheer indicator disregards contextual constraint, as well as those combinations of impact paths and effects.

The results are grounded in published papers, government documents, thematic analyses, and international and national data. Among these sources, papers by [6,11,12], and [13] were of crucial importance to the analysis. They have important results on the nature of reforms that produced better academic results, on the crucial role of high-quality teacher training as a necessary condition to unlock improvements in teaching and learning, and on the politics of such reforms. For instance [6], made an in-depth examination of innovative "triple classroom" in Chengdu, whereas [14] analyzed in-depth teachers' intention to participate in professional development that is subject to a balance between educational disparities between urban and rural areas. Recent summaries of such reviews of these reform(s) of their "living" versions and of numerous benefits as well as numerous questions that implementation of reform(s) raised can be found in [12] and in [13] that in turn constitute our work's theoretical basis.

Furthermore, these pieces were supplemented by including pieces from the MOE of China, which provided invaluable input to this work as well. These MOE sources aggregate information about the country as a whole, such as GER, test scores, teacher coverage, and geographic reach of information infrastructure across the country. As an illustration, MOE data, drawn from 2024 to 2022, demonstrate near-universal coverage of school access to the internet across all of China as well as millions of teachers in rural areas taking advantage of teachers' training courses. Furthermore, international sources such as UNESCO's ICT in Education Prize reports have been included judiciously to frame China's reform efforts in its broader international context. These analyses demonstrate how China's information technologies are subject to scrutiny and analysis outside its own borders, as well as providing alternative viewpoints to the highly regulated frame that country professes to itself.

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In a literature search, materials were exhaustively collected from Google Scholar and MOE official websites to facilitate a comprehensive set of sources. We utilized diverse keywords (digital education equity, teaching technology, China livestream classroom, urban-rural disparity) strategically to facilitate searching. We utilized backward snowballing, a method of searching additional literature by reference lists of seminal papers to uncover further studies of potential utility. Notably, our team did not include studies conducted outside Chinese contexts or that were not about reform of streaming to limit coverage of our present study.

The end-of-program report is a multi-evidence-informed report that is informed by a diverse collection of peer-reviewed literature, government data, and international documents. This combined format enables an analysis of research to address the evidence base in a systematic approach to having a rigorous consideration of challenging structural and societal contextual situations that exist behind stratified teaching classrooms. In summary, a depiction of how far the livestream programs can actually reduce the long-standing educational gap between Chinese urban and rural regions can be made through an application of this study's use of research processes.

4. Data analysis

4.1. Quantitative analysis

The first quantitative strand explores the correlation between internet class reforms through livestream and quantifiable decreases in the urban rural education gap. System-level indicators as furnished by the Ministry of Education and the national Smart Education of China (SEC) platform include student performance on provincial examinations, enrollment and transition rates, teacher allocation and retention, school level connectivity and bandwidth, and platform participation. The annual volumes are consistently rooted in the years and provinces where the definitions are equivalent [15]. Findings are displayed in the form of a comparative table having rural indicators alongside urban indicators and in a comparative mode of how rural outcomes are associated with urban outcomes for similar indicators. Also, pre- and post-implementation trend summaries at key reform time points facilitate interpretation of findings.

Because peer-reviewed studies present outcomes in a variety of measurement scales, standardized effects from published literature are used to provide equivalent interpretation of size. All quantitative summaries are treated as correlations, as secondary data forms the basis of the reports [15]. To mitigate possible distributional issues mainly in the form of differences in participation and gains due to local resources and the platform promotion and recommendation practices, subgroup differences are analyzed with reference to baseline resource levels and equity implications outlined in recent evaluations of Chinese online platforms [16].

Where data are sparsely missing, listwise deletion is used, but more patterned and documented missing are accounted for using elementary within-province imputations to preserve comparability. Sensitivity analyses are conducted by (a) repeating tabulations with other normalizations of parity and (b) running sensitivity analyses that exclude codes with significant COVID-related signals, where applicable [5,16].

4.2. Qualitative analysis

Qualitative thematic meta-analyses peer-reviewed case studies in combination with domestic implementation reports, and international evaluations to reveal how, when and under what conditions reforms result in gains. The volume of sources is coded following a hybrid codebook

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through which deductive categories drawn from policy implementation and classroom interaction theories are combined with inductive themes found in the texts. The results are presented in four categories:

1.Student Engagement and Interaction: Focus in this domain is on interactivity, attitudinal, and persistence matters in a synchronous class.

2.Teacher Adaptability and Support: Addresses co-teaching, mentoring, and how broadcast lessons align with local pacing.

3.Infrastructure and Access: Assesses the reliability of school-based connectivity, the availability of devices, and the usability of platforms.

4.Equity Targeting and Local Context: Examines inequalities in terms of county resource levels and the danger that market-driven content or recommendation systems privilege already privileged users [15,16].

The analysis recognizes that student and teacher digital literacy is an important mediating variable in the success of technology-enabled instruction, consistent with a larger K–12 literature on technology use and learning [17]. Site conditions such as good bandwidth, available local facilitation, and interactive pedagogy are connected to reported outcomes, such as achievement gains, retention, and classroom climate, in cross-case matrices. Negative cases, for example one way pt priming without local facilitation, are part of the comparison in order to define boundary conditions and prevent confirmation bias [15].

5. Findings and discussion

This study evaluates the effectiveness of China's livestream classroom reforms by integrating quantitative and qualitative evidence. The combination of both perspectives provides a clearer understanding of how these reforms are reducing educational inequalities while also highlighting challenges in implementation.

Quantitative data indicate that the reforms have led to measurable academic improvements. National statistics reveal that students participating in livestream classrooms gained an average of 0.85 additional years of schooling, with test score increases of 0.18 standard deviations in mathematics and 0.23 in Chinese [18] These findings are consistent with previous large-scale evaluations showing that access to livestream programs improves rural academic performance and reduces achievement gaps. As shown in Figure 1, these results demonstrate that livestream classrooms have narrowed disparities in core subject outcomes.

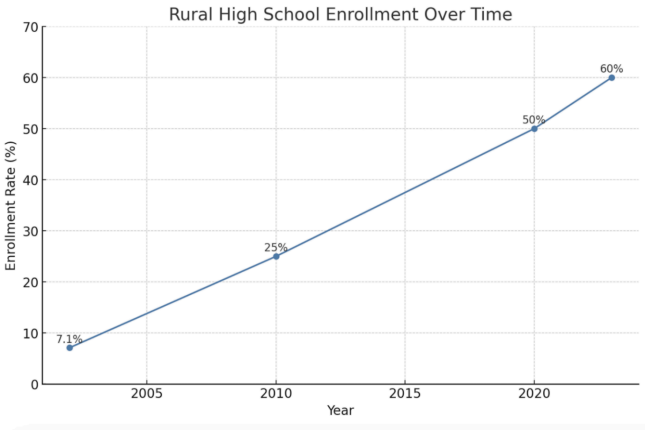

Figure 1. Test score gains among rural students in livestream classrooms [18]

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Note. Enrollment outcomes reinforce this trend. Rural high school enrollment increased from just 7.1 percent in 2002 to over 60 percent in some provinces by 2023.

This expansion parallels case studies such as [6], which documented how livestream partnerships between Chengdu No.7 High School and 248 rural schools dramatically increased university access. Nationally, more than 72,000 rural students have participated in livestream classrooms since 2002, and 88 were admitted to elite universities such as Peking University and Tsinghua University [18]. Figure 2 illustrates the steady rise in rural enrollment over time, underscoring the scale of change brought by these reforms.

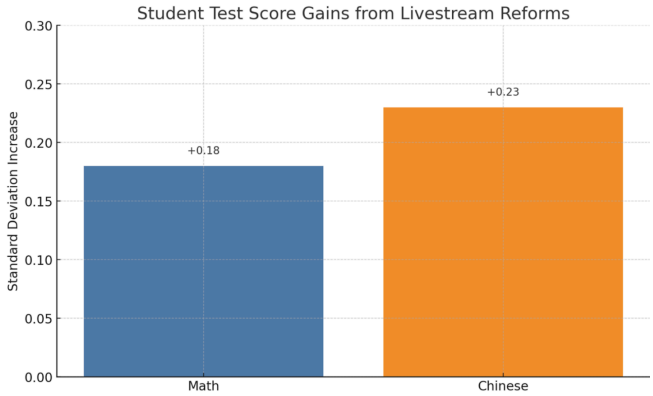

Figure 2. Rural high school enrollment rates from 2002 to 2023 [19]

Teacher quality has also improved as a result of livestream reforms. Since 2006, over 17 million teacher-training attendances have been recorded, 1.03 million new rural teachers recruited, and ¥130 billion invested in professional development [20]. These findings support earlier evaluations suggesting that teacher training and recruitment are critical to narrowing gaps in educational equity. Infrastructure indicators confirm similar progress: 100 percent of schools are now online, 99.9 percent have high-speed internet, and 99.5 percent are equipped with multimedia classrooms [21]. Figure 3 summarizes these systemic achievements, which demonstrate that livestream reforms address both human and material dimensions of inequality.

While statistical evidence highlights progress, qualitative findings illustrate how these reforms function in practice. Case studies from provinces such as Sichuan and Yunnan reveal that rural teachers frequently struggle to adapt livestream methods into their local classrooms, even after training [6]. Reports further show that although school connectivity is nearly universal, household internet access remains uneven, limiting the benefits of livestream learning outside the classroom [21]. Interviews also suggest that while students initially found livestream lessons engaging, particularly because they connected them to urban “star teachers”, sustained engagement declined when interaction was limited [18].

Independent evaluations emphasize that the reforms are most effective in poorer counties, where baseline access was weakest [21]. This finding aligns with the evidence presented here, which shows greater enrollment and performance gains in underdeveloped areas. At the same time, the persistence of barriers such as teacher readiness, infrastructure gaps, and limited home connectivity indicates that livestream reforms cannot serve as a complete solution on their own.

Collectively, these findings reaffirm that online classrooms are a powerful reform to abolish learning gaps, but further policy reinforcement is needed to make them a success. Ongoing training

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of teachers, further improvement of digital capacity in the villages, and additional interactive teaching techniques are necessary to create maximum long-term impact of the reforms.

6. Conclusion

This work tries to uncover if China's classroom reform of livestreaming might close regional gaps in schooling. By examining and aggregating quantitative data and case studies, a contingent affirmative impact has been rendered clear. When framed by consistent internet connectivity to support capacity locally and curriculum coordination, rural students have improved examination results and consequently make it to higher secondary school and higher education establishments. Now they have access to a higher school experience than previously. Meanwhile, educators now have access to electronic teaching resources that result in significant improvements in classroom environment quality. Generally, regional disparity is present, but gaps in school opportunities have decreased.

Why such progress has been made is clear. First, livestream allows remote area students to have much greater access to expert teaching and rich curriculum materials. Second, the teaching and mentoring model extends online teaching capacity. Third, national platforms lower the scale distribution cost of high-quality materials. Indeed, effectiveness does depend upon implementation quality: interactive pedagogy rather than broadcasting down a unidirectional corridor, continuation of local mentoring support, and operational school infrastructure all play a part. These trends fit policy implementation theory that results depend upon local capacity and coherence, and upon constructivist learning theories that invoke a proposition that active engagement generates more powerful learning.

In truth, some of this work itself has quite notable limitations. The evidence base is largely secondary sources such as peer-reviewed articles, administrative records, and foreign reports; no original data, no close observation of classrooms, nor interviews, so no causal inference is possible. Qualitative cases in this work largely only examine a subset of provinces, which drastically limits the external validity of the evidence to all rural environments. Additionally, variables are largely only available from years in the near past, inducing a constraint of only being able to draw inferences about short-run labor market performance and social mobility effects. Finally, the diverse presence of measurement and reporting practices across regions will have included some measurement biases that could not be controlled for as well.

This work can guide policy and research considerations. Focusing on the last-mile building blocks (reliably consistent broadband, access to devices, school-level information-technical support) is necessary, as is evidence-based practising-teacher development (co-planning, coaching, and feedback) and sustaining interactive instructional architecture. Systems must publish publicly transparent, comparable data and finance longitudinal studies of learners' trajectories through time. Additional work is also required on quasi-experimental design and school-level microdata to identify where, whom, and under what circumstances of contextual effect livestreaming results in the greatest improvement.

No silver bullet by any stretch of thought, live classrooms are a workable, large-scale intervention to eliminate learning gaps when thoughtfully deployed and sustained. As is China's example, when combined with astute policy and robust professional development, technology is capable of eliminating gaps between city and country classrooms. When thoughtfully invested in and examined deliberately, such a refinement to equity is tangible and highly transferable.

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References

[1] Zeng, H. (2025). Digital Transformation of Regional Education in China. Springer Nature.

[2] Mat Ibrahim, S., & Husnin, H. (2025). Challenges of Integrating Digital Technology Based Teaching among Secondary School Teachers in Petaling Perdana. International Journal of Academic Research in Business and Social Sciences, 15(4). https: //doi.org/10.6007/ijarbss/v15-i4/25341

[3] Culduz, M. (2024). Benefits and Challenges of E-Learning, Online Education, and Distance Learning. Advances in Higher Education and Professional Development Book Series, 1–27. https: //doi.org/10.4018/979-8-3693-4131-5.ch001

[4] L. Berge, Z., & E. Mrozowski, S. (1999). Barriers to Online Teaching in Elementary, Secondary, and Teacher Education. Canadian Journal of Educational Communication, 27(2).

[5] Chen, X., Chen, S., Wang, X., & Huang, Y. (2021). "I was afraid, but now I enjoy being a streamer!" Proceedings of the ACM on Human-Computer Interaction, 4(CSCW3), 1–32. https: //doi.org/10.1145/3432936

[6] Tian, J., Mao, W., Liao, L., & Zhou, X. (2021). Targeted Poverty Alleviation Model of China's Online Education Based on "Triple Classroom": Take the "Shi Shi Xiang Yun" Online School in Chengdu, China as an Example. Science Insights Education Frontiers, 9(1), 1183–1197. https: //doi.org/10.15354/sief.21.re035

[7] Freeman, M. (2025). Vygotsky and the Virtual Classroom: Sociocultural Theory Comes to the Communications Classroom. Scholars Crossing. https: //digitalcommons.liberty.edu/cpe/vol4/iss1/5

[8] NGP Capital | Bringing AI to online education in China. (2022). Ngpcap.com. https: //www.ngpcap.com/insights/building-perfect-artificial-intelligence-for-online-tutoring-in-china

[9] Heinkelmann-Wild, T., Berthold Rittberger, Zangl, B., & Kriegmair, L. (2024). The policy implementation hypothesis. In Oxford University Press eBooks (pp. 103–125). Oxford University Press. https: //doi.org/10.1093/oso/9780192870636.003.0005

[10] Huang, J., Huang, Y., Lin, H., & Yang, Z. (2021). Chinese Rural Female Students' Situation in Accessing to Education Resources: A Literature Review on Chinese Urban–Rural Differences. Proceedings of the 2021 International Conference on Public Relations and Social Sciences (ICPRSS 2021), 129–134. Atlantis Press. https: //doi.org/10.2991/assehr.k.211020.142

[11] Sun, Y., Zhu, X., Zhou, X., Yao, B., Zhang, K., Wang, D., Chen, J., & He, L. (2024). Who Changed the Destiny of Rural Students, and How?: Unpacking ICT-Mediated Remote Education in Rural China. arXiv preprint. [online] Available at: https: //arxiv.org/abs/2401.13799v1.

[12] Li, H., & Zhang, Y. (2024). Evaluating the effectiveness of livestream classroom reforms in China: Opportunities and challenges. Journal of Contemporary Educational Research, 8(3). 55-70.

[13] Guo, X., & Li, J. (2024). Livestream classrooms and regional equity in Chinese education: Policy outcomes and limitations. China Education Review, 10(1). 33-49.

[14] NGP Capital | Bringing AI to online education in China. (2022). Ngpcap.com. https: //www.ngpcap.com/insights/building-perfect-artificial-intelligence-for-online-tutoring-in-china

[15] Chen, X. (2023). Promoting Online Learning in Primary Schools in Rural China (Master's thesis). University of Toronto, Toronto, Canada.

[16] Lyu, F., & Mao, Y. (2025). The Impact of Chinese Online Education Platforms on Educational Equity: A Social Distributivist Perspective. In Proceedings of the 2nd International Conference on Educational Development and Social Sciences (EDSS 2025), 181–189. Atlantis Press. https: //doi.org/10.2991/978-2-38476-400-6_23

[17] Casal-Otero, L., Català, A., Fernández-Morante, C., Taboada, M., Cebreiro, B., & Barro, S. (2023). AI literacy in K-12: A systematic literature review. International Journal of STEM Education, 10: 29. https: //doi.org/10.1186/s40594-023-00418-7

[18] Zhang, L. (2024). Internet use and adolescent development in rural China: A scoping review protocol of research landscape and gaps. PLOS ONE, 19(9), e0308229. https: //doi.org/10.1371/journal.pone.0308229

[19] Ministry of Education of the People's Republic of China. (2023, February 12). Deepening Digital Transformation, Building A Bright Future: Keynote Speech at the 2023 World Digital Education Conference. Beijing, China.

[20] Sun, R., & Du, P. (2021). Does Teacher Training Narrow the Educational Gap between Urban and Rural Students? Empirical Evidence from CEPS Baseline Data. Best Evidence in Chinese Education, 9(2), 1243–1261. https: //doi.org/10.15354/bece.21.ar036

[21] UNESCO. (2023). UNESCO ICT in Education Prize. Unesco.org. https: //www.unesco.org/en/prizes/ict-education