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Regional Inequality in Special Education Funding and Staffing Across 20 Chinese Provinces

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Abstract. This study examined regional inequality in special education funding standards and resource provision using 2024 data from 20 Chinese provinces, representing 76.2% of national special education enrollment. Student-weighted Gini coefficients measured inequality, and Theil decomposition separated between-region from within-region differences. Spearman's rank correlation and ordinary least squares regression examined associations between funding standards and teacher and school provision. Half of the provinces reported the national minimum standard of 6,000 RMB. All seven provinces with standards above 7,000 RMB were in the East, and standards differed across regions (Kruskal-Wallis $p = 0.002$). Between-region differences accounted for 59.5% of inequality in funding standards and 46.0% in teachers, compared with 5.6% in schools. The school estimate increased to 31.2% when the Northeast was classified separately. Higher funding standards were associated with greater teacher density (Spearman $\rho = 0.45$, $p = 0.049$), but there was little evidence of an association with school density. The staffing association weakened and was no longer statistically significant after excluding Beijing, Tianjin and Shanghai. Regional differences in funding standards persisted across the sensitivity analyses. The staffing findings support closer assessment of needs in Central and Western provinces, but do not establish whether additional teachers should take priority over school construction.

Keywords: Special Education, Education Funding Policy, Regional Inequality

1. Introduction

1.1. Research background

In 2021 the General Office of the State Council issued an action plan for special education under the 14th Five-Year Plan. The plan set a target of 97% compulsory-education enrollment for children with disabilities by 2025 and described special education as a weak area of the education system, with development that remained unbalanced and inadequate [1]. The Regulations on the Education of Persons with Disabilities also require governments at or above the county level to fund the education of persons with disabilities [2].

The national government sets a minimum annual public funding standard for each student in special education, and provinces may adopt higher standards. This study examines how those

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standards vary across provinces and whether they are associated with teacher and school provision.

Blind and visually impaired children need specialist teaching and accessible materials, including Braille textbooks. Differences in the availability of these resources are therefore relevant to their educational opportunities.

1.2. Literature review

Chinese research on special education finance includes studies of expenditure trends and allocation, as well as the costs and benefits of education for persons with disabilities [3-6]. He used data envelopment analysis with a Malmquist index to compare fiscal input efficiency across regions using 2010–2018 panel data on special education schools [7]. The study attributed inefficiency in the Central region to insufficient investment and in the East to the management and use of funds. In the United States, research on the federal funding formula found that allocation rules disadvantage states with more children in poverty or in special education [8].

Evidence linking funding to educational outcomes is more limited. He's regional efficiency analysis [7] addresses how efficiently resources are used, rather than identifying the causal effect of funding on student outcomes. Other studies examine outcomes in small samples without measuring funding directly [9, 10]. These approaches leave the effect of funding on outcomes unresolved.

Studies from several countries describe gaps between inclusive education policies and the resources available in schools [11-19]. Shortages of teachers trained to work with visually impaired students recur in this literature [11, 13, 15-18].

1.3. Research gaps and questions

Prior Chinese research has examined expenditure patterns and regional fiscal input efficiency [3, 4, 6, 7]. This study focuses on the distribution of per-student funding standards and reported teacher and school provision. It decomposes inequality into differences between and within economic regions and examines associations between funding standards and resource provision.

The available provincial data do not disaggregate funding and enrollment by disability. The analysis therefore covers special education as a whole and cannot assess resources specifically available to blind or visually impaired students, such as Braille materials and orientation training.

This study asks how unequally funding standards and educational resources are distributed across provinces, how much inequality lies between economic regions, and whether funding standards are associated with teacher and school provision. The decomposition distinguishes broad regional differences from differences among provinces within the same region; it does not, by itself, determine which level of government should respond.

2. Methodology

2.1. Data sources

I compiled the data from publicly available sources. All variables refer to 2024 and form a single cross-section. Student, school and full-time teacher counts came from public datasets. Funding standards came from government websites and news reports.

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2.2. Study area

The study covers 20 of the 31 provincial-level units of mainland China, referred to here as provinces, for which complete 2024 data on the four analysis variables could be obtained. They enrolled 698,200 special education students, or 76.2% of the national total of 915,900 [20]. I grouped them into three economic regions following the classification of the National Bureau of Statistics.

The Eastern region includes Beijing, Tianjin, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong and Guangdong. The Central region includes Shanxi, Jilin, Anhui, Jiangxi, Henan, Hubei and Hunan, and the Western region includes Inner Mongolia, Guangxi and Sichuan.

2.3. Data processing

The four analysis variables are complete for all 20 provinces, so no values were imputed. From the raw counts I calculated four derived indicators (Section 2.4), and then the mean and standard deviation of each indicator by region.

2.4. Key variables

Per-student public funding, in RMB per year, is the provincial per-student public funding standard for special education, the guaranteed minimum annual allocation per student set by each provincial government. It records policy commitment, not realized spending, and excludes personnel and capital costs, which are budgeted separately. It takes only seven distinct values across the 20 provinces.

Special education enrollment includes children in regular schools as well as those in special education schools. Provincial enrollment provides the denominator for per-student measures and the weights for the inequality statistics. I calculated the student-teacher ratio as total special education enrollment divided by the number of full-time teachers in special education schools; teacher density expresses the inverse ratio per 100 students. The indicator labeled average school size divides the same enrollment total by the number of special education schools; school density expresses the inverse ratio per 10,000 students. Because the enrollment total includes regular-school placements, these ratios do not measure actual teaching loads or average enrollment within special education schools.

2.5. Analytical strategy

I measured inequality in each resource relative to enrollment with two statistics. The first is the Gini coefficient of per-student levels, weighted by provincial enrollment so that each student carries equal weight. The second is the Theil T index, $T = \Sigma\, s_i \cdot \ln(s_i / p_i)$, where s_i is province i's share of the resource and p_i its share of enrollment. Grouping provinces by region splits T into a between-region term, $\Sigma\, S_g \cdot \ln(S_g / P_g)$, where S_g and P_g are region g's shares, and a within-region term, the resource-share-weighted sum of the Theil indices inside each region.

I used the Kruskal-Wallis H test to compare regions. Spearman's rank correlation assessed associations between funding standards and resource provision using ranks, given that funding standards take only seven distinct values. I also fitted ordinary least squares regressions and reported 95% confidence intervals. Teacher density and the student-teacher ratio are scaled reciprocals, as are school density and average school size, so the analysis has two distinct resource outcomes.

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Residuals from the regression of teacher density on funding standards compare observed teacher density with the fitted value.

To check how far the results depend on particular provinces, I drew 2,000 bootstrap samples with provinces resampled within regions and recomputed the measures with each province dropped in turn. I also repeated the decomposition with Liaoning and Jilin in a separate Northeast region, as in the four-region scheme of the National Bureau of Statistics, and re-estimated the regression with enrollment weights and without the three municipalities of Beijing, Tianjin and Shanghai. All computations used Python 3 with NumPy and SciPy.

3. Results

3.1. Sample characteristics

Complete data on the four analysis variables were available for 20 provincial-level units, which together enrolled 698,200 special education students in 2024, or 76.2% of the national total of 915,900. Regional representation was uneven, ranging from ten Eastern units to three Western units. Table 1 reports descriptive statistics by region.

Table 1. Regional descriptive statistics, 2024

Indicator	East (n=10)	Central (n=7)	West (n=3)	National
Per-student funding standard (RMB/year)	8,850 (1,827)	6,143 (378)	6,000 (0)	—
Special education students	31,890 (23,905)	36,286 (18,404)	41,767 (27,054)	—
Student-teacher ratio	8.00 (1.84)	12.43 (3.78)	12.83 (5.77)	11.27
Teachers per 100 students	13.11 (2.99)	8.96 (3.60)	9.46 (5.60)	8.88
Students per school	336.4 (102.9)	367.7 (125.5)	391.4 (131.6)	382.3

Cells report the mean across provinces with the standard deviation in parentheses. The national column is the aggregate for China and is omitted for the student count, which is a national sum, and for funding standards.

3.2. Regional distribution of per-student funding standards

Mean per-student funding standards were 8,850 RMB per year in the Eastern region, compared with 6,143 RMB in the Central region and 6,000 RMB in the Western region (Table 1). Standards differed across regions (Kruskal-Wallis $H = 12.49$, $p = 0.002$).

The distribution was discrete rather than continuous (Figure 1). Ten of the 20 provinces reported a standard of exactly 6,000 RMB, the national baseline, and the remaining values fell on a small number of round figures. All seven provinces with standards above 7,000 RMB were in the Eastern region, and all three Western provinces were at 6,000 RMB.

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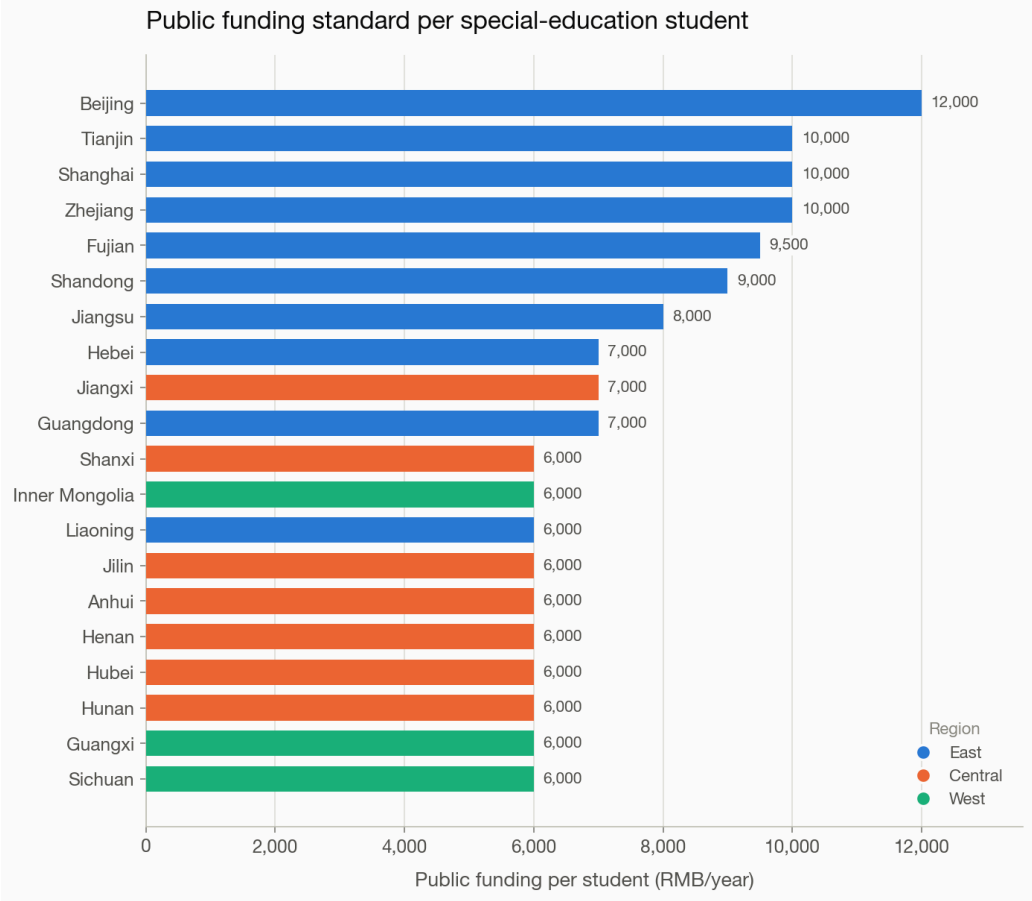

Figure 1. Per-student public funding standard by province, 2024, ordered by value and colored by region

3.3. Inequality in resources relative to enrollment

Student-weighted Gini coefficients and the Theil decomposition are reported in Table 2.

Table 2. Inequality in special education resources relative to enrollment, decomposed into between-region and within-region components

Resource	Gini	Theil T	Between-region	Within-region	% between
Funding standards	0.101	0.0190	0.0113	0.0077	59.5%
Teachers	0.186	0.0537	0.0247	0.0290	46.0%
Schools	0.163	0.0485	0.0027	0.0458	5.6%

The student-weighted Gini estimate was highest for teachers (0.186), followed by schools (0.163) and funding standards (0.101). Figure 2 shows the corresponding Lorenz curves, with the teacher curve lying furthest from the diagonal over most of the distribution.

The between-region share of total inequality varied by resource: 59.5% for funding standards, 46.0% for teachers and 5.6% for schools.

Eastern provinces enrolled 45.7% of students in the sample and employed 56.7% of teachers, a ratio of 1.24. Western provinces enrolled 17.9% of students and employed 13.6% of teachers, a ratio

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of 0.76.

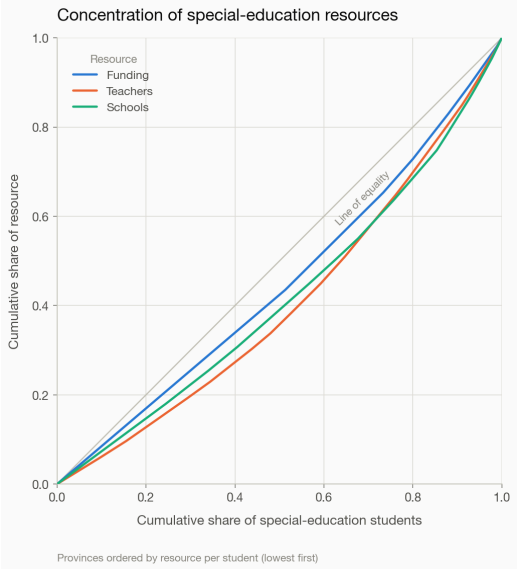

Figure 2. Lorenz curves of special education resources relative to enrollment. Provinces are ordered from the lowest to the highest level of the resource per student, and the diagonal represents allocation proportional to enrollment

3.4. Funding and teacher provision

Per-student funding standards were positively correlated with teacher density (Spearman $\rho = 0.446$, $p = 0.049$). In the ordinary least squares regression, a 1,000 RMB difference in the standard was associated with 1.00 more teachers per 100 students (95% CI 0.09 to 1.91, $R^2 = 0.227$, $p = 0.034$). Figure 3 shows the relationship.

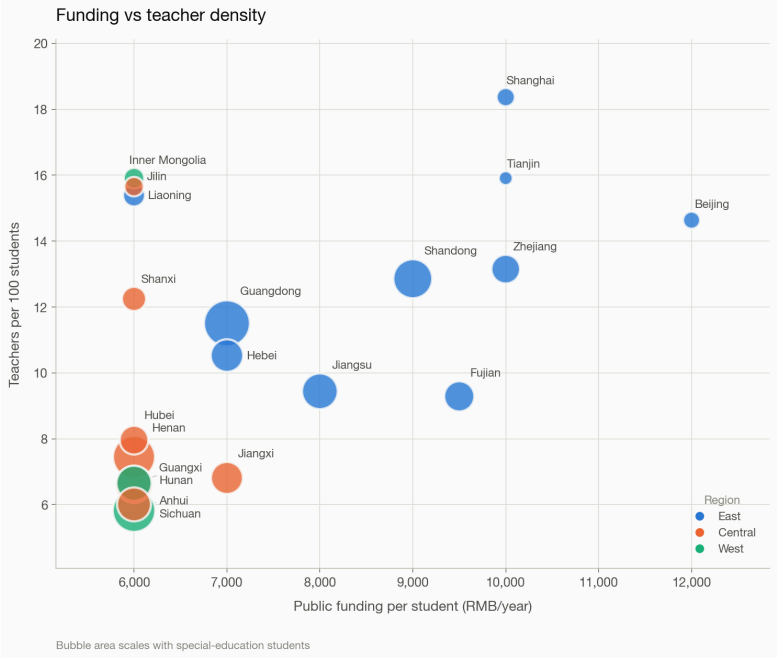

Figure 3. Per-student funding standard and teacher density. Bubble area is proportional to provincial special education enrollment, and color denotes region

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Mean student-teacher ratios were 8.00 in the Eastern region, 12.43 in the Central region and 12.83 in the Western region, against a national figure of 11.27. The regional difference was not significant (H = 4.99, p = 0.083). Figure 4 shows the provincial ranking.

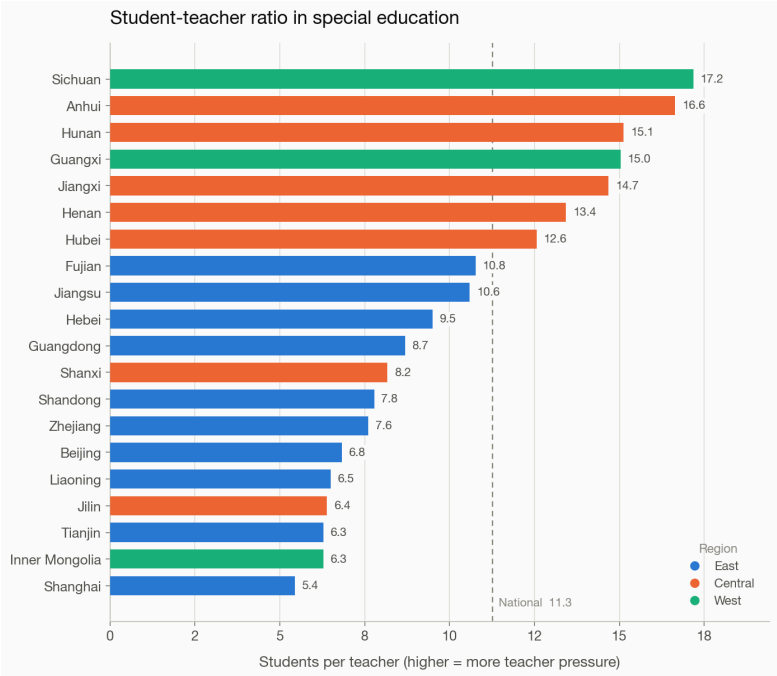

Figure 4. Student-teacher ratio by province, ordered from highest to lowest. The dashed line marks the national aggregate ratio of 11.3 students per teacher

3.5. Funding and school provision

There was little evidence of an association between per-student funding standards and schools per 10,000 students (Spearman ρ = 0.088, p = 0.713). The ordinary least squares model explained little variation (R^2 = 0.009, p = 0.694), and the slope's confidence interval included zero. The rank correlation was positive and the regression slope negative, but neither was statistically significant (Table 3).

Table 3. Associations between per-student funding standards and resource provision (n = 20)

Resource indicator	Spearman ρ	p	OLS slope per 1,000 RMB	95% CI	R^2
Teachers per 100 students	+0.446	0.0485	+0.998	[+0.09, +1.91]	0.227
Schools per 10,000 students	+0.088	0.7126	-0.556	[-3.48, +2.37]	0.009

The student-teacher ratio and average school size are scaled reciprocals of the two indicators shown and are not reported separately.

3.6. Residual analysis

Residuals compare observed teacher density with the value fitted from per-student funding standards. The largest positive residuals were for Inner Mongolia (+6.3), Jilin (+6.0) and Liaoning (+5.7); the largest negative residuals were for Fujian (-3.8), Jiangxi (-3.8) and Sichuan (-3.8). All residuals are expressed as teachers per 100 students.

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4. Discussion

4.1. Regional funding distribution

Funding standards clustered at the national minimum of 6,000 RMB (Figure 1). Most sampled Central and Western provinces remained at this level, whereas all standards above 7,000 RMB were in the East. Funding standards also had the lowest Gini estimate of the three resources (0.101). The national minimum may constrain downward variation in standards, but these cross-sectional data do not establish its effect on inequality. Differences in fiscal capacity could help explain why some provinces remain at the minimum, although fiscal capacity was not measured in this study.

4.2. School provision and staff provision

Under the three-region classification, school provision varied mainly among provinces within the same region, whereas funding standards and staffing had larger between-region components (Table 2). One possible explanation is the difference between capital expenditure on schools and recurring expenditure on teachers. School construction has been an explicit target of national special education plans [1], while staffing may depend on provincial quotas and local labor markets. These mechanisms were not tested here. Within the sample, the East's share of teachers was about a quarter higher than its share of students, and the West's was about a quarter lower.

4.3. Funding and staffing

Higher funding standards were associated with greater teacher density, but there was little evidence of an association with school density. Because the standard excludes personnel costs (Section 2.4), it should not be interpreted as expenditure on teacher salaries. Greater fiscal capacity could support both higher standards and more teaching posts, although that explanation was not tested. The regression explained about 23% of the variation in teacher density and was sensitive to the inclusion of the three municipalities (Section 4.5).

4.4. Provinces with large staffing residuals

Inner Mongolia, Jilin and Liaoning had the largest positive staffing residuals. Geographic dispersion could contribute to the result for Inner Mongolia if small schools require a minimum number of teachers, but this explanation was not tested. Fujian, Jiangxi and Sichuan had the largest negative residuals and together enrolled about 136,000 special education students. These provinces warrant closer investigation, although deviations from the fitted relationship are not estimates of unmet staffing need.

4.5. Relation to prior research

Earlier descriptive studies documented regional disparities in special education funding in China [3, 6], and He examined regional differences in fiscal input efficiency [7]. The present analysis assesses resource distribution relative to enrollment rather than spending efficiency. It separates between-region from within-region inequality and shows that the decomposition differs across resources and regional classifications. International studies of visually impaired students report shortages of trained teachers and other resources needed for inclusive education [11-18]. The teacher counts

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analyzed here, however, cover all full-time teachers in special education schools and do not identify staff trained specifically for visual impairment.

4.6. Policy implications

The concentration of standards at the national minimum suggests that provinces differ in their capacity or willingness to fund special education above that level. Central transfers could be considered as a response to these differences, but the analysis does not evaluate the effectiveness of any transfer design. Reporting both between-region and within-region inequality would help distinguish broad regional disparities from differences among provinces within each region.

The staffing results support closer assessment of teacher provision in Central and Western provinces, but do not establish that hiring teachers would yield greater benefits than building schools. Raising the per-student operating standard would not directly fund additional teachers because personnel costs are budgeted separately. Staffing quotas and the supply of trained teachers are possible constraints that require separate evidence.

4.7. Limitations and future research

The sample covers 20 of 31 provinces, including only three in the West. Missing provinces limit geographic coverage, and their effect on the between-region estimates cannot be determined from the available data. Funding is measured as a policy standard rather than actual spending, and several standards come from news reports or local republications instead of provincial documents.

The one-year cross-section supports descriptive comparisons and associations, not causal estimates. Because the ratios use enrolled students as the denominator, they do not capture unmet need among eligible children who are out of school; lower enrollment could make resources per enrolled student appear higher. Student counts include regular-school placements, whereas teacher counts cover special education schools only, so some differences in teacher density may reflect placement patterns rather than staffing. None of these measures identifies provision specifically for blind children.

Data for all 31 provinces, with enrollment in special education schools reported separately, would improve coverage and help distinguish placement patterns from staffing differences. A multi-year panel would allow fixed-effects analysis, while a difference-in-differences study would require an appropriate policy change and comparison group. Disability-specific longitudinal data would also allow research on the progression of blind students beyond compulsory schooling.

5. Conclusion

Funding standards differed across regions in this 20-province sample, with most sampled Central and Western provinces at the national minimum and higher standards concentrated in the East. This pattern persisted across the sensitivity analyses. The findings for staffing and schools were less stable: the contrast between their between-region shares narrowed when the Northeast was classified separately, and the funding–staffing association weakened after excluding Beijing, Tianjin and Shanghai.

These descriptive results concern funding standards and reported resource provision, not actual expenditure or educational outcomes. They support closer investigation of staffing needs in Central and Western provinces but do not determine investment priorities. Complete provincial data with

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separate enrollment counts for regular and special education schools are needed to assess whether the observed staffing differences reflect unmet need.

References

[1] General Office of the State Council. (2021). Notice on forwarding the 14th Five-Year Plan action plan for the development and improvement of special education. (Guobanfa [2021] No. 60).

[2] State Council. (2017). Regulations on the education of persons with disabilities. (State Council Decree No. 674).

[3] Xiong, Q., & Lei, J. (2012). An analysis of the expenditure structure in special education schools in China. *Chinese Journal of Special Education*, (3), 21–27.

[4] Zhao, X., Wang, L., & Wang, Y. (2014). An analysis of and suggestions for the funding and expenditure in special education schools. *Chinese Journal of Special Education*, (10), 3–9.

[5] Wang, S., & Xing, Y. (2016). A cost-benefit analysis of education for disabled persons from the perspective of human capital. *Chinese Journal of Special Education*, (7), 3–11.

[6] Du, Y. (2024). The funding guarantee pattern and policy prospects for the development of public-interest special education. *Chinese Journal of Special Education*, (3), 12–22.

[7] He, Z. (2023). Regional differences and trends in fiscal input efficiency: A case study of special education. *China Market*, (4). https://www.cnki.com.cn/Article/CJFDTotal-SCZG202304004.htm

[8] Kolbe, T., Dhuey, E., & Doutre, S. M. (2023). Unequal and increasingly unfair: How federal policy creates disparities in special education funding. *Exceptional Children, 90*(1), 57–75. https://doi.org/10.1177/00144029221148784

[9] Rosas, R., Espinoza, V., Martínez, C., & Santa-Cruz, C. (2023). The paradoxes of inclusion: Cognitive and socio-emotional developmental trajectories of deaf and blind primary education students in mainstream and special schools. *Frontiers in Education, 8*, 1227178. https://doi.org/10.3389/feduc.2023.1227178

[10] Affum, G. O. (2024). Assessing the effect of special education initiatives on learning outcomes and employment opportunities: A case of visually impaired students in Ghana [Senior thesis/project, Ashesi University]. *Ashesi Institutional Repository*. https://air.ashesi.edu.gh/items/159e2046-7b96-43a8-a5a3-1d38bbc553bd

[11] Solebo, A. L., Teoh, L. J., Sargent, J., Rahi, J. S., & British Childhood Visual Impairment and Blindness Study Interest Group. (2023). Health, education, and social care provision after diagnosis of childhood visual disability. *Developmental Medicine & Child Neurology, 65*(6), 803–810. https://doi.org/10.1111/dmcn.15447

[12] Cueva-Vargas, J. L., Laballestrier, C., & Nemargut, J. P. (2025). The experiences of living with a visual impairment in Peru: Personal, medical, and educational perspectives. *International Journal of Environmental Research and Public Health, 22*(7), 984. https://doi.org/10.3390/ijerph22070984

[13] Mpolomoka, D. L. (2026). Classroom experiences of learners with visual impairments in selected schools in Zambia. *British Journal of Visual Impairment, 44*(3), 742–764. https://doi.org/10.1177/02646196251352361

[14] Ramatea, M. A. (2026). Decolonizing barriers for inclusive education of learners with visual impairments in rural mainstream schools. *British Journal of Special Education, 53*(1), 18–28. https://doi.org/10.1111/1467-8578.70064

[15] Schles, R. A., Low, J., Conway, A., & Petersen, D. M. (2026). Improving access for students who are deaf-blind through collaboration. *TEACHING Exceptional Children, 58*(5), 298–306. https://doi.org/10.1177/00400599251340639

[16] Sukati, V. N. (2025). Access to basic education: A literature review of challenges facing children living with visual impairment in Sub-Saharan Africa. *British Journal of Visual Impairment, 43*(2), 437–446. https://doi.org/10.1177/02646196241235284

[17] Awang, A., Abdul Rani, I. F., & Kway, E. H. (2024). Special needs education for the visually impaired in Malaysia. *Southeast Asia Early Childhood Journal, 13*(2), 122–131. https://doi.org/10.37134/saecj.vol13.2.9.2024

[18] Çetin, S. (2025). Equity in assessment: Addressing systemic barriers for visually impaired students. *International Journal of Educational Research, 133*, 102757. https://doi.org/10.1016/j.ijer.2025.102757

[19] Wild, T. A., Herzberg, T. S., Fast, D. K., Rodocker, J., & Kart, M. (2024). Experiences of rural teachers of students with visual impairments during the pandemic. *The Journal of Special Education Apprenticeship, 13*(1). https://doi.org/10.58729/2167-3454.1196

[20] Ministry of Education. (2025). Statistical bulletin on national educational development in 2024. http://www.moe.gov.cn/jyb_sjzl/sjzl_fztjgb/202506/t20250611_1193760.html