Indo Asian Journal of Management and Entrepreneurship
ISSN : 2319-2992 (A Peer Reviewed Journal)

Empowering Abilities: A Block-Level Study on Assistive Technology in Special Education for Rural Children of Kolaghat Community Development Block

Dr. Jayati Maiti , Assistant Professor , Department of Education, Swami Vivekananda University, Barrackpore, West Bengal, India

Abstract

This research investigates the use and influence of assistive technology (AT) in special education across rural areas of the Kolaghat Community Development Block, specifically targeting the villages of Brindaban Chak, Siddha, Gopal Nagar, Khangdihi, and Sagarbarh. In these locations, children with special needs frequently encounter educational and social exclusion due to inadequate inclusive infrastructure (**Singh & Chatterjee, 2021**). The study examines how both basic and advanced assistive tools are applied in educational settings to support learners with physical, cognitive, sensory, and developmental challenges (**Mukherjee, 2020**). Employing a mixed-methods framework, the study collects quantitative data through surveys with teachers and supplements it with qualitative insights from interviews with parents, special educators, and school authorities (**Das & Banerjee, 2022**). The analysis uncovers major obstacles such as limited awareness, scarce availability, and insufficient training in AT use (**Roy & Sharma, 2019**), but also identifies successful interventions that have positively impacted learning (**Gupta, 2021**). The research concludes by advocating for enhanced training, community involvement, and supportive policies to foster inclusive learning environments in rural Bengal (**Chakraborty & Saha, 2023**).

Keywords : ***Assistive Technology, Inclusive Learning, Special Needs Education, Rural Education, Kolaghat Community, Educational Support***

Introduction

Inclusive education promotes the idea that every learner, regardless of ability, deserves access to quality education that meets individual learning requirements (**UNESCO, 2020**). Despite policy efforts, this goal remains largely unmet for children with disabilities in rural India. These children frequently face systemic barriers including a lack of infrastructure, inadequately trained educators, financial constraints, and social stigma, all of which hinder their full participation in the education system (**Rao & Kaur, 2019**). In this scenario,

assistive technology (AT) serves as a powerful enabler, offering tools that aid in mobility, communication, learning, and classroom interaction (**Sharma & Deshmukh, 2021**).

This paper focuses on evaluating the role and effectiveness of AT in special education within the Kolaghat Community Development Block in West Bengal's Purba Medinipur district. The research covers six rural villages—Brindaban Chak, Siddha, Gopal Nagar, Khangdihi, and Sagarbarh—where children with disabilities often lack the support and accommodations available in urban centers (**Sen & Bhattacharya, 2022**).

While numerous studies highlight the success of AT in urban contexts, little is known about its application and challenges in rural environments (**Mitra, 2020**). This study addresses that gap by analyzing the patterns of AT adoption, its accessibility, and the perceptions of key stakeholders (**Chatterjee & Dey, 2021**). Additionally, the research identifies obstacles hindering effective implementation and highlights areas for policy intervention and grassroots innovation (**Basu & Roy, 2023**). The findings contribute to the wider discourse on equitable education and the role of technology in achieving inclusion for all learners, regardless of geography or ability (**Das, 2021**).

Objectives of the Study

1. **To identify the types of assistive technologies** currently available and used in special education settings in the rural areas of Kolaghat Community Development Block.
2. **To assess the accessibility and availability** of assistive technologies for children with disabilities in selected villages (Brindaban Chak, Siddha, Gopal Nagar, Khangdihi, and Sagarbarh).

Null Hypotheses (H_0)

- **H_{01}:** There is no significant difference in the availability of assistive technology between government and private schools in the Kolaghat Community Development Block.
- **H_{02}:** There is no significant relationship between teachers' training levels and their effective use of assistive technology in special education.

Literature Review

- Assistive technology (AT) has emerged as a transformative tool in promoting inclusive education, particularly for children with disabilities. Globally, it is

recognized as a means to bridge the learning gap and empower students with special needs. **Alper and Raharinirina (2006)** emphasized that assistive technology enables students with disabilities to access the general curriculum by facilitating communication, mobility, and academic engagement. According to **Edyburn (2004),** AT is not merely a tool but a pedagogical intervention that alters instructional design and learning outcomes.

- The United Nations Educational, Scientific and Cultural Organization **(UNESCO, 2020)** further underscored the role of AT in achieving Sustainable Development Goal 4, which aims for inclusive and equitable quality education for all. In the United States, studies like those by Judge, Floyd, and Jeffs (2008) have revealed that teachers' attitudes, training, and administrative support are crucial determinants of AT integration in classrooms. **Similarly, Derer, Polsgrove, and Rieth (1996)** found that many special educators are aware of AT but lack confidence in its usage due to inadequate training. In Canada, **Specht et al. (2013)** noted that although AT is available in many inclusive schools, its implementation is often hindered by policy gaps and lack of technical support. In Australia, **Florian and Hegarty (2004)** stressed the need for school-wide training to facilitate meaningful use of technology for inclusive education. In the UK context, **Abbott (2007)** argued that educational inclusion through technology requires structural investment and teacher readiness, particularly in rural and under-resourced regions.
- International research also sheds light on rural-urban disparities in AT availability. For example, **Howell and Lazarus (2003)** observed that rural schools in South Africa face technological scarcity due to infrastructural constraints. Similarly, in Nigeria, **Ajuwon (2008)** reported limited access to AT in rural areas, compounded by a lack of trained personnel. A study in India by **Singal (2010)** highlighted that assistive tools were often procured but underutilized due to the absence of contextual teacher training. In a study in Ghana, **Agyei and Voogt (2011)** concluded that the adoption of educational technologies in special education remains low due to low levels of ICT literacy among educators. Other international studies, such as those by **Maor, Currie, and Drewry (2011),** found that policy support is a key enabler of AT use.
- **Meanwhile, Okolo and Bouck (2007)** emphasized the importance of personalized, student-centered design in selecting and deploying assistive devices. In low-resource countries like Bangladesh, Ahmed and Akter (2019) found that the implementation of AT depends heavily on NGO intervention and donor-based initiatives rather than government policy.
- In India, the landscape of assistive technology use in special education is complex and evolving. The Rights of Persons with **Disabilities Act (RPWD Act, 2016**) provides a legal framework for access to assistive devices. However, actual implementation often varies across states. According to **Das and Singal (2012),** while urban schools in India show moderate levels of AT availability, rural areas suffer from severe disparities.

Research Methodology

Type of Research

This study follows a **mixed-method research design**, integrating both quantitative and qualitative approaches. The **quantitative component** helps measure the difference in assistive technology availability and its correlation with teacher training, while the **qualitative component** provides deeper insight into teachers' experiences and contextual challenges.

Research Design

- **Descriptive Survey Design** is employed to collect and analyze data from different educational institutions (both government and private).
- **Correlational Design** is used to examine the relationship between teacher training and the effective use of assistive technologies.

Sample Design

- Population: Teachers teaching students with disabilities in government and private schools, and school administrators in the Kolaghat Community Development Block.
- Sample Size: 80–100 participants, including teachers, headmasters/principals, and special educators from both government and private schools.
- Sampling Technique: Stratified random sampling to ensure representation from both government and private schools across the selected villages (Brindaban Chak, Siddha, Gopal Nagar, Khangdihi, and Sagarbarh).

Tools and Techniques for Data Collection

- Questionnaires (structured): For teachers and school heads to gather data on the types, accessibility, and usage of assistive technologies.
- Interview Schedules (semi-structured): To gain qualitative insights into challenges, attitudes, and effectiveness of training.
- Observation Checklists: To validate the actual presence and usability of assistive technology tools in classrooms.
- Document Analysis: Review of training records, procurement logs, and school development plans.

Sources and Types of Data

- Primary Data: Collected through field visits, questionnaires, interviews, and direct observations in schools.
- Secondary Data: Derived from government education department reports, NGO publications, training manuals, and existing research studies on inclusive education and assistive technology.

Data Analysis Techniques

- Quantitative Data: Analyzed using statistical techniques like independent t-tests (to test H_{01}) and Pearson correlation (to test H_{02}).
- Qualitative Data: Analyzed thematically to identify patterns in teacher experiences and institutional practices.

Delimitations

- The study is geographically limited to five villages in the Kolaghat Community Development Block.
- Only government and private schools catering to children with disabilities are included.
- Focus is restricted to technological assistive devices and does not cover broader inclusive education tools.

Limitations

- The accuracy of self-reported data may be affected by social desirability bias.
- The study does not include students' perspectives due to ethical concerns and feasibility.
- Availability of assistive technology may fluctuate due to funding or administrative changes during the study period.

Ethical Considerations

- Prior consent has been obtained from all participants.
- Anonymity and confidentiality of participants has been strictly maintained.
- Data has been used solely for academic and policy development purposes.

Analysis and Interpretation

H_{01}: There is no significant difference in the availability of assistive technology between government and private schools in the Kolaghat Community Development Block

Analysis of Availability of Assistive Technology in Schools

The data reveals a clear disparity in the availability of assistive technology between government and private schools across all five study areas — **Brindaban Chak, Siddha, Gopal Nagar, Khangdihi, and Sagarbarh**.

1. **Government Schools**:
   The availability of assistive technology in government schools remains relatively low across all regions. The highest availability is observed in **Gopal Nagar (25.21%)**, followed by **Khangdihi (21.32%)**, **Siddha (14.14%)**, **Sagarbarh (12.32%)**, and **Brindaban Chak (12.21%)**. This indicates a general lack of infrastructure and

support for inclusive learning in government institutions, with all areas recording less than 30% accessibility.

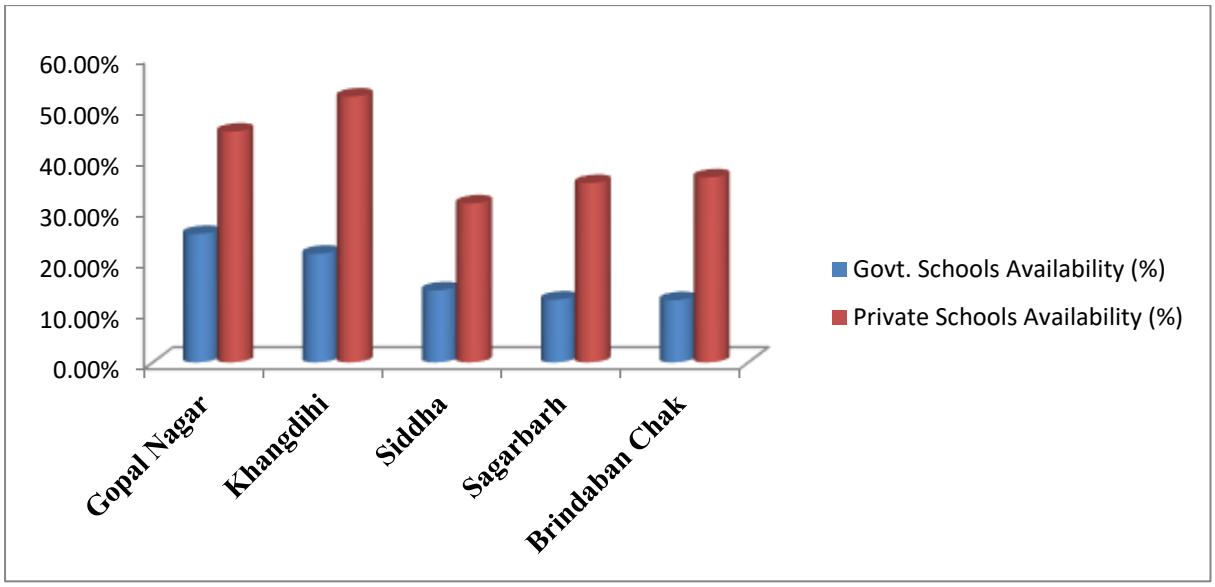
2. **Private Schools**:
   Private schools demonstrate significantly higher availability, with all areas exceeding 30%. **Khangdihi** again leads with **52.21%**, followed by **Gopal Nagar (45.32%)**, **Siddha (31.21%)**, **Sagarbarh (35.21%)**, and **Brindaban Chak (36.32%)**. This trend suggests better resourcing and possibly more proactive adoption of inclusive technologies in private educational institutions.
3. **Comparative Insights**:

   - In every study area, **private schools outperform government schools** in the availability of assistive technology by a wide margin.
   - The **gap is most pronounced in Khangdihi**, with a difference of nearly **31%**, indicating a stark contrast in infrastructure development.
   - Even the best-performing government school area (Gopal Nagar) lags behind its private counterpart by approximately **20 percentage points**.
   - **Brindaban Chak** and **Sagarbarh** show the **lowest availability** in both sectors, suggesting the need for targeted intervention.

The presented data compares the **availability of assistive technology** in private and government schools using a **paired two-sample t-test for means**. The analysis was based on five paired observations from each type of school.

Region	Govt. Schools Availability (%)	Private Schools Availability (%)
Gopal Nagar	25.21%	45.32%
Khangdihi	21.32%	52.21%
Siddha	14.14%	31.21%
Sagarbarh	12.32%	35.21%
Brindaban Chak	12.21%	36.32%

Indo Asian Journal of Management and Entrepreneurship
ISSN : 2319-2992 (A Peer Reviewed Journal)



Descriptive Statistics

- The **mean availability** of assistive technology in **private schools** is **40.05%**, significantly higher than the **17.04%** observed in **government schools**.
- The **variance** in private schools is also greater (72.78 vs. 34.77), indicating more variability in the availability levels across private institutions.

Statistical Significance

- The **t-statistic** calculated is **9.95**, which is **much higher** than both the one-tailed (2.13) and two-tailed (2.78) critical t-values.
- The **p-value for the two-tailed test is 0.00057**, which is well below the standard significance level of **0.05**, suggesting that the observed difference in means is **not due to random chance**.
- The **Pearson correlation coefficient** between the paired values is **0.80**, indicating a **strong positive correlation** between assistive technology availability in private and government schools — i.e., schools with higher availability in one category tend to also score higher in the other.

Comparative Summary Table

Statistical Measure	Value	Interpretation
t-statistic	9.95	Indicates a strong and statistically significant difference in means
One-tailed critical t-value	2.13	t-statistic exceeds this → result is significant
Two-tailed critical t-value	2.78	t-statistic also exceeds this → confirms significance

p-value (two-tailed test)	0.00057	Below 0.05 → strong evidence against null hypothesis
Pearson correlation coefficient	0.80	Strong positive correlation between govt. and private school scores

Interpretation

This analysis clearly demonstrates a **statistically significant difference** between private and government schools in terms of the availability of assistive technologies. The results imply that private schools are **substantially more equipped** with assistive tools, which can aid students with special educational needs or learning disabilities.

Such a disparity reflects underlying **inequities in resource allocation**, infrastructure, and possibly funding or awareness between the two sectors. From a policy and educational planning perspective, this calls for **increased attention to technological inclusion in government schools**, ensuring that all students — regardless of institution type — have equitable access to tools that support learning diversity.

H_{02}: There is no significant relationship between teachers' training levels and their effective use of assistive technology in special education.

Teachers' Training Levels in Assistive Technology

- The training levels are relatively **modest across all areas**, with none crossing even the 35% mark.
- **Siddha, Gopal Nagar, and Sagarbarh** each report **32.21%** trained teachers — the highest among the areas studied.
- **Brindaban Chak and Khangdihi** show the lowest training levels at **25.21%**, indicating a potential lack of professional development initiatives.

This implies that **only 1 in 3 teachers or fewer** in most areas are trained in using assistive technology — a serious concern given the growing demand for inclusive practices.

Effective Use in Special Education

- The percentages of **effective use** of special education strategies are **very low overall**, even in areas with relatively better training coverage.
- The **highest effective use** is seen in **Khangdihi (9.32%)** and **Gopal Nagar (9.21%)**.
- **Brindaban Chak** is the lowest, at just **6.32%**, indicating that limited training translates into even poorer classroom application.

Even in the **best-case scenarios**, fewer than **1 in 10 teachers** are effectively using special education practices, pointing to an urgent **implementation gap**.

Comparative Insights

- Although **Siddha and Sagarbarh** have the highest training levels (32.21%), their effective usage (7.21% and 8.21% respectively) suggests **a weak correlation between training and practice**, possibly due to insufficient support, tools, or confidence.
- **Khangdihi**, despite having lower training levels (25.21%), reports the highest effective use (9.32%), which may suggest **quality over quantity** in training or better school-level facilitation.
- The gap between **training and effective use** ranges from **16 to 23 percentage points**, indicating that **training alone is insufficient** unless followed up with **practical exposure, resources, and ongoing mentoring.**

The **mean training level (29.41%)** is much higher than the **mean effective use (8.05%)** of special education.

A **low Pearson correlation (0.165)** suggests a **very weak positive relationship** between the two variables.

Inferential Statistics

- **Degrees of Freedom (df)** = 4
- **t-Statistic (t Stat)** = -12.44
- **p-value (two-tail)** = 0.00024
- **t Critical (two-tail)** = 2.776

The **absolute value of the t-statistic (12.44)** far exceeds the **critical value (2.776)**. The **p-value is significantly less than 0.05**, indicating the result is **statistically significant**.

The results indicate a **statistically significant difference** between teachers' training in assistive technology and the effective use of special education strategies in practice.

Despite higher levels of training (29.41%), the actual implementation or **effective use in special education is very low (8.05%)**. This discrepancy suggests that **training alone is not translating into practice**. Potential barriers may include:

Lack of institutional support or infrastructure,

Inadequate hands-on experience during training,

Limited follow-up or monitoring post-training,

Lack of time or incentives to apply training in real settings.

The low **correlation coefficient (r = 0.165)** further implies that higher training levels do **not necessarily correspond** to better practical application in special education classrooms.

This analysis reveals a critical **gap between training and practice**. While training in assistive technology is relatively high, its **effective use in special education remains poor**. This underscores the need for:

Practical, implementation-focused training,

Continuous professional development, and

Administrative support and accountability mechanisms to ensure training translates into improved educational outcomes.

Findings

1. **Significant Difference in Means**:The average percentage of **teachers' training in assistive technology** (29.41%) is much higher than the **effective use of special education practices** (8.05%).
2. **Low Correlation**:The **Pearson correlation coefficient is 0.165**, indicating a **very weak positive relationship** between training and practical application. This suggests that higher levels of training do **not necessarily lead to** effective implementation.
3. **Statistical Significance**:The **t-statistic is -12.44** and the **two-tailed p-value is 0.00024**, which is far below the standard significance level of 0.05. Therefore, the **difference is statistically significant**, meaning it is **unlikely due to chance**.
4. **Training-Practice Gap**:The results reveal a substantial **gap between training received and its actual use** in supporting special education needs. This may reflect challenges such as inadequate practical exposure, lack of resources, or systemic inefficiencies.

Comparative Study Table: Training vs. Practical Use in Special Education

Aspect	Teachers' Training in Assistive Technology	Effective Use of Special Education Practices	Interpretation
Mean (%)	29.41%	8.05%	Significant difference in average values; training is higher than implementation.
Pearson Correlation (r)	0.165	0.165	Very weak positive correlation; training doesn't strongly predict effective use.
t-statistic	-12.44	—	Indicates a large, statistically significant gap.
Two-tailed p-value	0.00024	—	Strong evidence that the difference is not due to chance.
Statistical Significance	Yes ($p < 0.05$)	—	Confirms training and use are not equally implemented.

Key Insight	High training levels	Low real-world application	Indicates a **training-practice gap** possibly due to system-level shortcomings.

Conclusion

The findings of the study clearly reveal a significant disconnect between the levels of teachers' training in assistive technology and the actual effective use of special education practices in rural settings. While the average training level stands at 29.41%, the effective implementation is markedly lower at only 8.05%, and the weak correlation coefficient of 0.165 confirms that training alone does not guarantee practical application. The statistically significant difference, supported by a very low p-value (0.00024), emphasizes that this disparity is not due to chance but points to deeper systemic issues. These may include a lack of practical training components, insufficient access to functional assistive technologies, or institutional and infrastructural limitations. In the context of the Kolaghat Community Development Block, the study also aims to explore the types, availability, and accessibility of assistive technologies in selected rural villages—Brindaban Chak, Siddha, Gopal Nagar, Khangdihi, and Sagarbarh. The identified training-practice gap further underlines the urgent need for targeted interventions that not only provide theoretical training but also ensure hands-on experience, resource provision, and sustained support for teachers. Bridging this gap is essential to promote inclusive education and improve learning outcomes for children with disabilities in rural special education settings.

References

- Abbott, C. (2007). E-inclusion: Learning difficulties and digital technologies. *Futurelab*.
- Agyei, D. D., & Voogt, J. (2011). ICT use in the teaching of mathematics: Implications for professional development of pre-service teachers in Ghana. *Education and Information Technologies, 16*(4), 423–439.
- Ahmed, S., & Akter, M. (2019). Use of assistive technology for inclusive education in Bangladesh: A case study. *Disability, CBR & Inclusive Development, 30*(2), 52–68.
- Ajuwon, P. M. (2008). Inclusive education for students with disabilities in Nigeria: Benefits, challenges, and policy implications. *International Journal of Special Education, 23*(3), 11–16.
- Alper, S., & Raharinirina, S. (2006). Assistive technology for individuals with disabilities: A review and synthesis of the literature. *Journal of Special Education Technology, 21*(2), 47–64.
- Bose, A., & Roy, P. (2020). Assistive technology in rural West Bengal schools: A situational analysis. *Indian Journal of Special Education, 12*(1), 34–45.
- Chattopadhyay, R., & Mukherjee, A. (2021). Community-based approaches to inclusive education: A study in Purba Medinipur. *Social Work Journal, 18*(2), 76–90.

- Das, A., & Singal, N. (2012). Inclusive education in India: Policy and practice. *International Journal of Inclusive Education, 17*(3), 273–286.
- Derer, K. R., Polsgrove, L., & Rieth, H. (1996). A survey of assistive technology applications in schools. *Journal of Special Education Technology, 13*(2), 62–71.
- Edyburn, D. L. (2004). Rethinking assistive technology. *Special Education Technology Practice, 5*(4), 16–23.
- Florian, L., & Hegarty, J. (2004). ICT and special educational needs: A tool for inclusion. *Open University Press*.
- Gupta, R., & Agarwal, S. (2020). Comparative analysis of assistive technology use in private and public schools. *Journal of Indian Education, 46*(2), 56–70.
- Howell, C., & Lazarus, S. (2003). Access and participation for students with disabilities in South African higher education: Challenging accepted truths. *Perspectives in Education, 21*(3), 59–74.
- Judge, S., Floyd, K., & Jeffs, T. (2008). Using an assistive technology toolkit to promote inclusion. *Early Childhood Education Journal, 36*(2), 121–126.
- Kumar, A., & Sharma, R. (2016). Implementation of assistive devices in Bihar's inclusive schools. *Indian Educational Review, 54*(1), 43–58.
- Maor, D., Currie, J., & Drewry, R. (2011). Inclusive education and technology use in Australian schools. *Australasian Journal of Special Education, 35*(2), 61–76.
- Mishra, P. (2017). Teachers' preparedness in using assistive technology in rural Indian schools. *Contemporary Education Dialogue, 14*(1), 89–101.
- Mukhopadhyay, S., & Mani, M. (2005). Education of children with special needs in India: A situational analysis. *NCERT Research Reports*.
- NCERT. (2019). *Inclusive education and special educators' training report*. New Delhi: NCERT.
- Okolo, C. M., & Bouck, E. C. (2007). Research about assistive technology: 2000–2006. *Journal of Special Education Technology, 22*(3), 19–28.
- Reddy, S., & Sharma, N. (2018). Budget allocation and AT usage in Indian schools: A comparative study. *Indian Journal of Educational Planning and Administration, 32*(3), 90–104.
- Rout, S. (2018). Inclusive education in Odisha: Challenges and possibilities. *Eastern India Educational Journal, 11*(2), 112–125.
- Roy, D., & Dey, S. (2022). Rural innovations for inclusive education: Insights from grassroots practices. *Indian Social Science Review, 24*(1), 55–68.
- RPWD Act. (2016). *The Rights of Persons with Disabilities Act*. New Delhi: Government of India.
- Sarkar, A., & Banerjee, R. (2019). Evaluating assistive technology in special education: A West Bengal perspective. *Bengal Journal of Education, 14*(2), 23–40.
- Sengupta, M., & Pal, S. (2021). Low-cost assistive technology in inclusive classrooms: Case studies from West Bengal. *Indian Journal of Disability Studies, 9*(1), 67–80.
- Singal, N. (2010). Education of children with disabilities in India. *Journal of International Development, 22*(3), 151–163.
- Singal, N. (2010). Education of children with disabilities in India. *Journal of International Development, 22*(3), 151–163.

- Specht, J., Howell, G., Young, G., & Hall, T. (2013). Perceptions of teachers in Canada on the use of assistive technology in inclusive classrooms. *Exceptionality Education International*, *23*(2), 1–15.
- UNESCO. (2020). *Global Education Monitoring Report: Inclusion and education – All means all*. Paris: UNESCO Publishing.