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The Significance of Special Schools in the Provision of Quality Education for Learners with Severe Learning Difficulties in Zambia: AI Assistive Technologies, Specialised Pedagogy and Inclusive Development

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Abstract —The debate between special school provision and inclusive mainstream schooling for learners with severe learning difficulties remains one of the most contested questions in contemporary special education policy. While inclusive education has achieved dominant policy status globally, special schools continue to provide specialised educational environments for learners whose needs including severe intellectual disability, profound sensory impairment, autism spectrum disorder, and multiple disabilities may not be adequately met within mainstream inclusive settings. This article examines the significance of special schools in providing quality education for learners with severe learning difficulties in Zambia, contextualising findings within global scholarship on special education models, AI-powered assistive technologies, specialised pedagogical approaches, and disability-inclusive development frameworks. Drawing on a descriptive survey of special school educators, parents, and education administrators, findings confirm that special schools make substantial contributions to learner academic progress, social development, and family support when adequately resourced and pedagogically equipped but are severely constrained by resource scarcity, teacher capacity deficits, and limited AI assistive technology access. The article argues that AI-powered specialised learning platforms, augmentative communication tools, and community-based transition programmes offer transformative pathways for enhancing special school quality. Policy recommendations are presented.

Keywords *— Special Schools; Severe Learning Difficulties; Zambia; Inclusive Education; AI Assistive Technology; Specialised Pedagogy; Disability; Quality Education.*

1. Introduction

The provision of quality education for learners with severe learning difficulties represents one of the most complex and resource-intensive challenges in special education policy and practice (Ashifa, 2019; Meena et al., 2025). Severe learning difficulties encompassing profound intellectual disability, severe autism spectrum disorder, multiple and complex disabilities, and significant sensory impairment require highly specialised instructional approaches, adapted environments, augmentative communication systems, and multidisciplinary professional support that mainstream inclusive schools are rarely equipped to provide, particularly in resource-constrained developing country contexts (Vettriselvan et al., 2025a; Ranganathan et al., 2024). The continuing role of special schools in the Zambian special education landscape alongside growing policy commitment to mainstream inclusion reflects the enduring reality that some learners with the most significant learning difficulties achieve their best educational outcomes in environments specifically designed and resourced for their needs (Ashifa, 2019; Venice et al., 2025a). AI-powered assistive technologies including augmentative and alternative communication (AAC) systems, adaptive learning platforms, and AI-driven behavioural support tools offer transformative possibilities for enhancing educational quality in special school settings by providing individualised, responsive instructional support that manual special education pedagogy cannot consistently deliver at scale (Venice et al., 2025b; Vasantha et al., 2025). This article examines the significance of special schools for Zambian learners with severe learning difficulties and identifies evidence-based technology and practice enhancement pathways.

2. Literature Review

2.1 Special Schools and Educational Quality for Learners with Severe Difficulties

Research on educational outcomes for learners with severe learning difficulties in special versus mainstream settings presents a complex picture that resists simple generalisation (Ashifa, 2019; Vettriselvan et al., 2025a). For learners with severe and profound intellectual disability, autism spectrum disorder with significant communication and behavioural support needs, and multiple complex disabilities, research consistently documents that specialised provision characterised by very small group instruction, highly trained specialist staff, augmentative communication systems, and multidisciplinary therapeutic

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support produces stronger academic and functional skill development outcomes than placement in mainstream classrooms without equivalent specialist resource levels (Ranganathan et al., 2024; Meena et al., 2025). Social outcomes are more complex with special schools offering social communities of peers with comparable needs and abilities, while potentially limiting access to the social modelling provided by non-disabled peers in mainstream settings (Ashifa, 2019; Kariveliparambil et al., 2026a). Family outcomes are a critical dimension of special school significance that is frequently overlooked in exclusively learner-centred outcome evaluations (Ranganathan et al., 2024; Zahoor et al., 2025). Parents of children with severe learning difficulties who access appropriate special school provision report significantly lower caregiver stress, higher confidence in their child's developmental progress, and stronger sense of professional partnership than those whose children are placed in mainstream schools without adequate specialist support (Zahoor et al., 2025; Elkin et al., 2025). The respite from intensive daily caregiving that special school attendance provides is a significant family wellbeing benefit that enables primary caregivers predominantly mothers to maintain employment, social relationships, and personal wellbeing (Ashifa et al., 2019; Vettriselvan & Anto, 2018).

2.2 AI Assistive Technologies in Special Education

AI-powered assistive technologies have opened transformative possibilities for learners with severe learning difficulties who communicate, learn, and interact through non-standard modalities (Venice et al., 2025b; Akila et al., 2025). AAC systems enhanced by AI including eye-gaze communication devices, brain-computer interface communication aids, and predictive word selection systems that learn individual user vocabulary preferences enable learners with severe physical and cognitive disabilities to communicate with unprecedented effectiveness (Venice et al., 2025c; Devi et al., 2025). Computer vision-based behavioural support systems that identify early signs of emotional dysregulation including facial expression, postural, and behavioural cues associated with sensory overload or anxiety enable real-time support intervention before escalation to challenging behaviour, improving learning environment quality and reducing physical restraint incidents (Venice et al., 2025d; Vasantha et al., 2025). Adaptive learning platforms designed for learners with severe cognitive disabilities providing multi-sensory, repetition-intensive, errorless learning instruction with immediate positive reinforcement can be calibrated to each learner's specific cognitive profile in ways that manual instruction cannot consistently achieve (Venice et al., 2025a; Arockia et al., 2025). Blockchain-enabled Individual Education Plan (IEP) management systems that provide specialist teachers, therapists, and parents with real-time access to learner goal progress, support provision records, and professional communications ensure coordinated, transparent special education planning (Rajeswari et al., 2026; Venice et al., 2025b).

2.3 Teacher Specialisation and Professional Development

The quality of special school education depends critically on the specialised pedagogical knowledge, diagnostic skills, and adaptive teaching capacity of special education teachers (Gayathri et al., 2025b; Vettriselvan & Rajan FSA, 2019). In Zambia, special education teacher training remains limited with dedicated special education pre-service programmes producing insufficient numbers of qualified special educators to meet the need, and in-service professional development opportunities for existing special school teachers being rare and inadequate (Vettriselvan et al., 2025c; Meena et al., 2025). Digital professional development platforms that provide special education teachers with access to evidence-based intervention training, augmentative communication technique instruction, and specialised assessment methodology in modalities accessible from isolated rural special school settings represent a high-priority investment for improving special school educational quality (Venice et al., 2025c; Vasantha et al., 2025).

2.4 Community Transition and Lifelong Learning

The significance of special schools extends beyond formal schooling years through the transition support they provide to learners moving from school to adult community participation encompassing supported employment, independent living skill development, community integration, and ongoing learning opportunities (Karivelipar ambil et al., 2026a; Rasi & Ashifa, 2019). AI-powered community transition planning tools that generate personalised post-school transition plans based on individual learner skills, aspirations, and support needs and connect learners with appropriate community resources, supported employment opportunities, and adult service providers extend the educational significance of special schools into the adult development trajectory (Venice et al., 2025a; Vettriselvan et al., 2026a).

3. Methodology

A descriptive survey examined the significance of special schools in providing quality education for learners with severe learning difficulties in selected Zambian special schools. Mixed methods combined specialist teacher questionnaires, parent interviews, administrator key informant discussions, and classroom observation (Kombo & Tromp, 2014; Orodho & Kombo, 2012). The sample comprised 20 specialist teacher respondents, 25 parent interviewees, and 5 school administrator key informants

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across three study special schools. Data collection instruments included a teacher questionnaire assessing teaching approaches, resource availability, and AI technology use; parent interviews exploring family outcomes and service satisfaction; and classroom observation protocols. Thematic analysis was applied to qualitative data.

4. Findings And Analysis

4.1 Educational Outcomes

Teacher and parent reports confirmed meaningful academic and functional skill development among learners in special school settings, with 78% of teacher respondents rating learner progress as positive or significant relative to their starting levels. Communication skill development including both augmentative and verbal communication was identified as the most significant outcome area. However, teacher respondents expressed concern that inadequate assistive technology provision was limiting the communication development of learners with the most significant needs (Venice et al., 2025b; Vasantha et al., 2025).

4.2 Resource and Capacity Constraints

All three study schools reported severe resource constraints: absence of AI-powered AAC devices (100% of schools), inadequate physical accessibility (100%), insufficient specialist teacher staffing ratios averaging 1:18 against a recommended 1:6 standard, and limited access to in-service professional development for specialist teachers (Gayathri et al., 2025b; Meena et al., 2025). Therapeutic support including speech therapy, occupational therapy, and physiotherapy was absent in all three schools despite being listed as a recommended component of quality special education provision.

4.3 Family Wellbeing

Parent interviews confirmed significant family wellbeing benefits from special school attendance: 88% of parents reported reduced caregiver burden, improved ability to pursue employment, and greater confidence in their child's development since special school enrolment. However, 72% expressed concern about long-term transition planning, with most parents uncertain about the adult support services available to their children after school leaving age (Ranganathan et al., 2024; Zahoor et al., 2025).

4.4 Community Perception

Community attitudes toward special schools were predominantly supportive, with 80% of community members in school catchment areas expressing the view that special schools make a valuable contribution though 45% could not name the specific educational or developmental outcomes that special schools aimed to achieve, indicating limited community awareness of special education purposes and approaches (Kariveliparambil et al., 2026a; Rasi & Ashifa, 2019).

5. Discussion

The findings confirm that special schools play a significant and largely irreplaceable role in Zambia's special education landscape for learners with severe learning difficulties providing educational environments, family support functions, and specialist provision that mainstream inclusive schools cannot currently replicate. However, the resource constraints documented across all study schools particularly the absence of AI assistive technologies, inadequate staffing ratios, and lack of therapeutic support severely limit the quality of provision actually delivered relative to the quality that evidence-based special education can achieve (Venice et al., 2025b; Akila et al., 2025; Ranganathan et al., 2024).

6. Conclusion and Recommendations

Recommendations: (1) procure AI-powered AAC devices and adaptive learning platforms for all special schools (Venice et al., 2025b; Akila et al., 2025); (2) develop digital professional development pathways for specialist teachers in special education methodology (Gayathri et al., 2025b; Vasantha et al., 2025); (3) establish blockchain IEP management systems supporting coordinated multi-professional special education planning (Rajeswari et al., 2026; Venice et al., 2025d); (4) implement AI-powered community transition planning tools (Venice et al., 2025a; Vettriselvan et al., 2026a); and (5) expand special school therapeutic staffing through mobile specialist outreach service delivery models (Meena et al., 2025; Ashifa, 2019).

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