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Original Article

Supporting Learners with Neurodevelopmental Disabilities: Mixed Method Evidence on the Use and Accessibility of Technology-Enabled Tools for Screening, Individualised Education Planning and Remote Supervision in Ghana

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Neurodevelopmental disabilities, Technology-enabled screening, Intervention plans, Remote supervision, Universal Design for Learning.

ABSTRACT

Despite the growing global call for inclusive education, neurodivergent learners in low-resource contexts, such as Ghana, frequently face significant barriers, including delayed screening and inadequate individualised support. This study focuses on documenting inclusive teaching practices, access and use of technology-enabled tools for screening, individualised education planning and remote supervision for teachers to support learners with neurodevelopmental disabilities across three urban school clusters in the Greater Accra Region of Ghana. A mixed methods approach was used, combining structured questionnaires administered to 202 school-based respondents (classroom teachers, headteachers and special educators), and qualitative insights from Focus Group Discussions with national-level Special Education Division staff of the Ghana Education Service. Findings highlight significant deficits in current inclusive practices. The majority of participating schools (71.3%) reported that learners are not routinely screened for neurodevelopmental disabilities. Furthermore, while the respondent pool consists mostly of experienced teachers (over 50% with 11-38 years of experience), a large majority (80.7%) reported having no formal, specialised training in special needs education. This evidence highlights persistent challenges in screening inconsistency, underdeveloped remote support systems and low teacher familiarity with Universal Design for Learning principles, all of which constrain effective inclusive education. These data provide a robust, context-specific foundation that confirms critical gaps in professional preparation and operational practice for inclusive education, and the findings are relevant to the Ghanaian context and beyond.

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INTRODUCTION

Sustainable Development Goal 4 (SDG 4) provides a global mandate for inclusive education, yet achieving this goal remains a key global challenge, especially for neurodivergent learners in low-resource contexts who still face significant barriers (UNICEF, 2023; Zickafoose, 2024). Inclusive education seeks to ensure that all learners, including those with neurodevelopmental disabilities, are provided equitable access to quality education within mainstream classrooms (UNESCO, 2017; Ydo, 2020). Achieving this goal requires early identification of learners' needs, individualised intervention planning and continuous teacher support (Florian & Beaton, 2018).

In low and middle-income countries (LMIC) such as Ghana, learners with neurodevelopmental disabilities frequently experience exclusion due to delayed screening and inconsistent identification processes (Florian & Beaton, 2018; Reddy et al., 2024). Technological and low-cost tools such as mobile phones, messaging applications and simple data collection platforms can support early screening, intervention planning and remote supervision of teachers where in-person support is limited (Gorni et al., 2024; Reddy et al., 2024). For instance, technology-enabled screening tools such as tablets and mobile phones have shown potential in improving early identification through enabling faster, accessible and data-rich assessments and through supporting personalised intervention planning (Desideri et al., 2021; Reddy et al., 2024). Yet, there are scarce culturally responsive screening tools suitable for low and middle-income countries (LMIC) contexts (Marlow et al., 2019).

Second, adaptive learning technologies are increasingly used to personalise instruction and learning activities to students' ability levels, supporting tailored learning experiences and informing intervention planning (Simon & Zeng, 2024). Third, the integration of technology with Universal Design for Learning (UDL), a learner-centred framework that promotes flexible teaching by enhancing accessibility and adaptability in educational settings, has been identified as a strategy for improving learning outcomes in broader global contexts (Bucheli et al., 2024; Stolz, 2020). Together, these approaches offer a complementary strategy for supporting both learners and teachers. Although Universal Design for Learning (UDL) has been globally recognised as a framework that facilitates inclusive instruction by guiding differentiation, most teachers in Ghana are either unaware of or only partially familiar with the concept and lack confidence in applying UDL (Adom et al., 2023).

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Moreover, in Ghana, inclusive education has been embraced through national policies and programs; however, its implementation has encountered persistent challenges (Asamoah et al., 2022; Ofori et al., 2025). The major challenges in Ghanaian schools are a lack of adequate special needs educators in classrooms, a lack of teaching and learning material and support for learners with diverse needs (Opoku et al., 2022). Evidence shows that screening for neurodevelopmental disabilities remains inconsistent, often relying on teacher observation rather than standardised tools (Nakalule et al., 2025). Teachers often perform screening informally without sufficient professional development or technical support (Inclusive Development Partners, 2022).

In addition, essential tools for remote supervision of teachers and feedback, such as mobile apps that focus on remote supervision, are underdeveloped, which limits continuous professional development support and quality assurance that could enhance teacher competence in inclusive practices (Gorni et al., 2024; Guerin & Aitchison, 2021). Weak digital infrastructure, limited access to internet-enabled devices and insufficient training constrain the use of these tools for remote supervision in schools.

These challenges suggest the need for a deeper understanding of how screening, supervision and UDL can be effectively integrated to support learners with neurodevelopmental needs within Ghana's educational context. This evidence is relevant to other LMIC contexts beyond Ghana (Inclusive Development Partners, 2022; Sepadi, 2025).

Aim of the Study

This study aimed to examine inclusive educational practices for learners with neurodevelopmental disabilities in Ghana, focusing on technology-enabled screening, remote supervision, and the application of UDL. Specifically, it sought to address the following aims:

- Assess the current practices and challenges in screening and intervention planning for learners with neurodevelopmental disabilities.
- Examine the availability, effectiveness and challenges of remote supervision for teachers in supporting inclusive education.
- Explore teachers' familiarity and confidence in applying UDL principles in inclusive classrooms.

METHODS

The design combined quantitative and qualitative approaches to gain both statistical insights and contextual understanding. Quantitative data were gathered through structured questionnaires administered to teachers, headteachers and special educators, while qualitative insights were collected from key informant focus group discussions with the Special Education Division (SpED) from Ghana Education Service (GES) employees. The integration of both methods ensures triangulation and enhances the validity and reliability of findings (Creswell & Creswell, 2018).

Sampling & Sample Size

For the quantitative component of the study, three clusters of public schools in the Greater Accra Region were selected based on their involvement in inclusive education programs. The clusters are located in urban districts within the region, namely, Ablekuma West Municipal, La-Nkwantanang Madina-Municipal and Accra Metropolitan, and include schools spanning lower primary, upper primary and Junior High School levels. The study comprised six schools from the Ayalolo cluster (within Accra Metropolitan), six schools from the Madina cluster (within La-Nkwantanang Madina-Municipal) and five schools from the Dansoman 'A' cluster (within Ablekuma West Municipal). Since all the schools were organised within clusters, these clusters served as the primary sampling strata. A proportionate estimate was calculated based on the teacher population size of each cluster, after

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which 202 participants were randomly selected within the designated schools. Within these schools, data collection activities involved four primary groups:

(i) Classroom Teachers: As the largest group of participants, 178 teachers were sampled from schools using stratified purposive selection to capture variation across grade levels (kindergarten, lower primary, upper primary and Junior High School) and subject areas. This approach balanced the need for representativeness with feasibility in terms of time and resources.

(ii) Headteachers: Given that each school has a single headteacher, a census approach was used, with all 17 headteachers from the participating schools invited to take part.

(iii) Special Needs Coordinators: Each district and region has designated coordinators. Only two out of the three special education coordinators responsible for the three sample districts were available.

(iv) Special Educators: Given that the number of special educators within the study area was limited, a census approach was also applied, and all five special educators were included.

For the qualitative component, the study adopted a purposive sampling strategy to engage national-level Special Education Division (SpED) staff of the Ghana Education Service. Participants (N=5) were selected based on their roles in policy oversight, coordination, and supervision of special and inclusive education at the national level. The focus group discussions were facilitated by the Craft Education team using a predefined protocol. The focus group discussion was conducted with members of the National SpED team, providing insights from those responsible for guiding screening approaches, supporting schools, and overseeing implementation across districts.

Context

The screening process in Ghana is a multi-agency system which consists of actors such as the Ghana Education Service and Ghana Health Service, Special Education Co-ordinators and teachers. National guidelines have a tiered referral system involving teachers, headteachers, Special Education Coordinators, psychologists, health professionals, and Assessment Centres. Referral pathways after screening exist but are entirely dependent on follow-through by parents. Special-education coordinators at district levels are the main actors who are responsible for screening learners and providing feedback.

Ethical Considerations

The study was conducted in accordance with ethical principles for educational research outlined by the British Education Research Association (2018). Approval was obtained from the Director General of the Ghana Education Service. Participation consent was formalised prior to participation, confirming that all participants understood the study's objectives and were aware of their right to withdraw consent at any point. Data was anonymised to protect confidentiality. Given the sensitivity of working with neurodivergent learners, the study avoided direct engagement with children and instead relied on adult reporting. Questions were framed to minimise stigma and emphasise professional practices rather than personal judgments of participants.

RESULTS

Demographic Characteristics of Respondents

A total of 202 respondents completed surveys. The highest number of respondents came from the Dansoman Cluster of Schools (39.1%), followed closely by the Madina Cluster of Schools (38.6%), while the Ayalolo Cluster of Schools contributed 22.3%.

With respect to participant gender, the data revealed that the majority of respondents were

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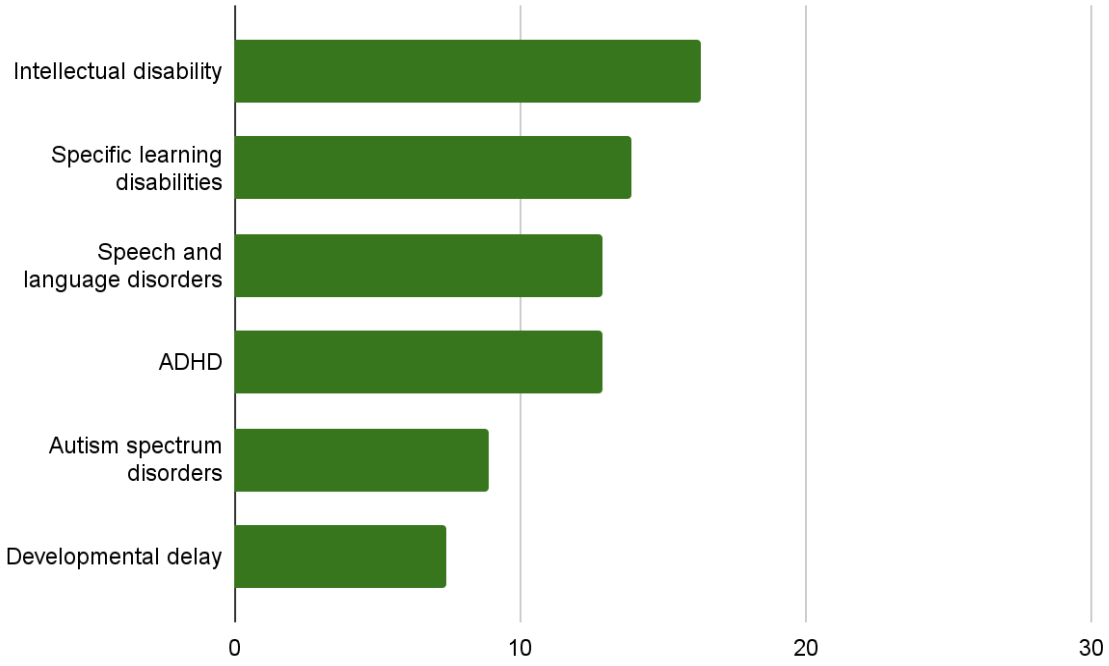
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females (73.8%). Regarding their roles in the schools, most respondents were classroom teachers (86.6%), followed by headteachers (9.4%). A few participants were special education teachers (1.5%). Other roles, including district special education coordinators, resource teachers, assistant headteachers, and service personnel, each represent less than one percent of the total sample.

In terms of academic qualification, more than half of the respondents (58.4%) held a Bachelor's Degree in Education, while 20.8% possessed a Master's Degree in Education. Additionally, 13.4% had a Diploma in Education, and a smaller proportion held certificates, Postgraduate Certificates in Education, or other qualifications (7.4% combined). Concerning qualifications specifically related to special needs education, the majority (80.7%) reported having no formal training in special education, while 18.3% had such qualifications, and 0.9% did not respond.

Analysis of the class or school level taught indicated that nearly half of the respondents (47%) were teaching at the Junior High School level. Others taught at the Upper Primary (18.3%), Lower Primary (16.3%), and Kindergarten levels (6.9%). A small percentage (2%) taught in special education classes, while 9.4% were involved in other educational roles, such as administrative roles.

Figure 1: Distribution of Respondents by Teaching Level

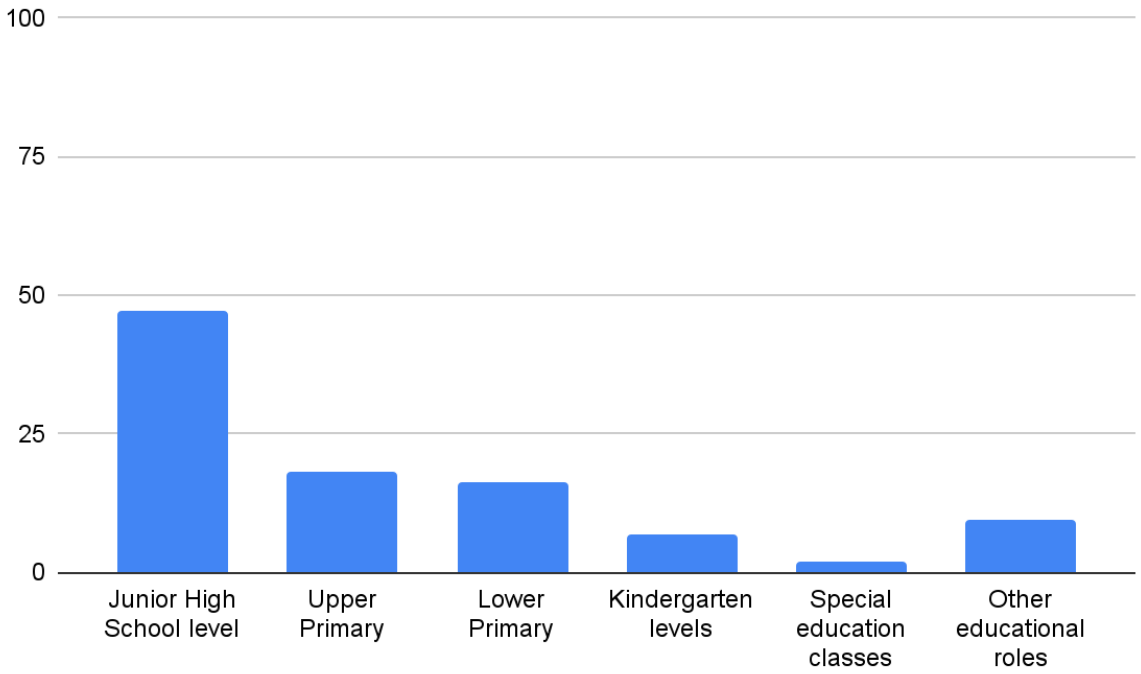


With respect to general teaching experience, 28.2% of respondents had between 1 and 10 years, 27.2% had between 11 and 19 years, 29.2% had between 20 and 28 years, and 13.9% had between 29 and 38 years of experience. However, this lengthy background correlated with a notably low experience in special education, given that the majority (59.4%) have only 0 to 4 years of experience as special educators. This indicates that the core of the teaching staff has extensive general teaching experience but no specialised experience. Overall, the results indicate that the majority of participants were experienced teachers with limited specialised training in special needs education, suggesting a potential gap in professional preparation for inclusive education, especially among older teachers.

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Figure 2: Distribution of General Teaching Experience Compared to Special Education Experience Among Respondents.



The remainder of the text presents results by the three foci of the study: A. Current screening tools; B. Tech-enabled intervention planning; C. Remote supervision and UDL implementation.

A. Current Screening Tools

Evidence from Survey Data

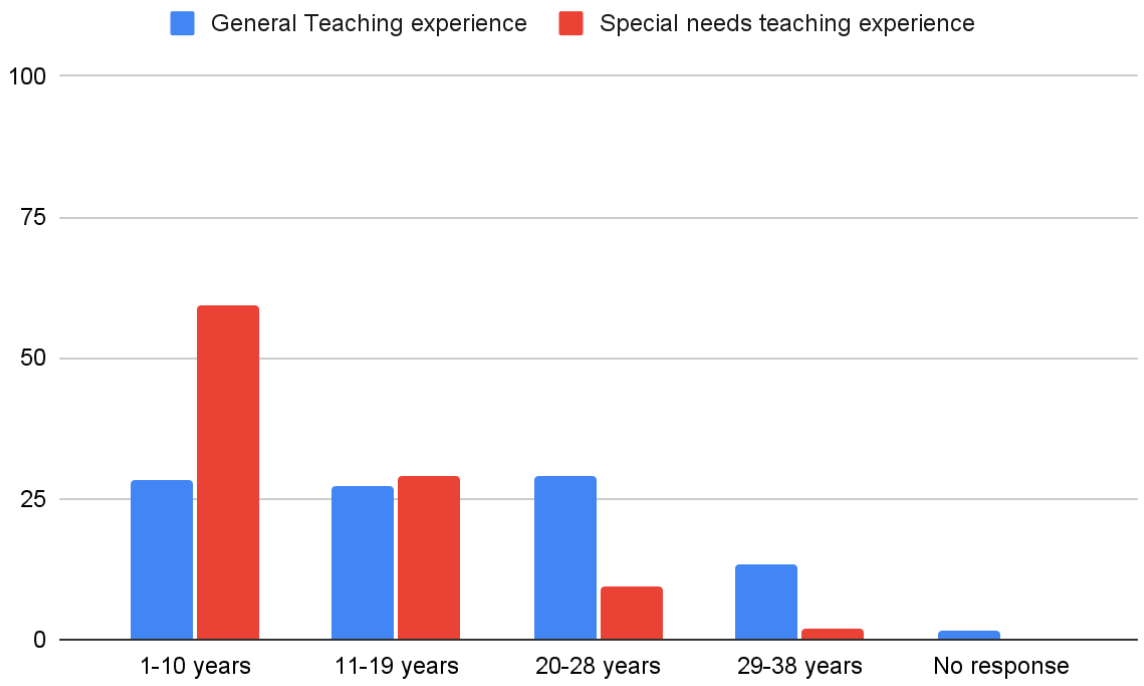
We start by reporting findings from the survey data. As shown in Figure 3, the majority of respondents (71.3%) indicated that learners in their schools were not screened for neurodevelopmental disabilities, while only 28.2% confirmed that screening upon referral took place. This finding suggests that routine screening upon referral for neurodevelopmental conditions is not widely practised in most of the sampled schools.

Among the schools that conducted screening (n = 57), the conditions most frequently screened for included intellectual disability (16.3%), specific learning disabilities such as dyslexia (13.9%), speech and language disorders (12.9%), and attention deficit hyperactivity disorder (ADHD) (12.9%). Screening for autism spectrum disorder (8.9%) and developmental delay (7.4%) was less common, while a few respondents were unsure of which disabilities were screened.

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Figure 3: Neurodevelopmental Conditions Frequently Screened



Personnel Responsible for Screening

The study findings reveal important differences between expected screening standards in Ghana and the realities of implementation within schools. Although national guidelines envisage a tiered referral system involving teachers, Special Education Coordinators, psychologists, health professionals, and Regional Assessment Centres, the results show that screening responsibilities were largely managed internally at the school level with assistance from regional and district actors.

Results indicate that special education coordinators (15.8%) who are placed at district centres and teachers (12.9%) were the primary personnel responsible for screening learners, followed by resource teachers (5.9%), health professionals (4.0%), and regional assessment centres (3.0%). Other contributors, including psychologists and national assessment centres, were mentioned by very few respondents.

Methods Used for Screening

Paper-based methods were the most widely used screening approach (50%), followed by combined paper and digital methods (29.6%). A few respondents (18.5%) were unsure of the methods used, while only 1.9% reported exclusive use of digital methods. This demonstrates a heavy reliance on traditional, non-digital screening approaches.

Knowledge and Confidence in Screening

With respect to knowledge levels, nearly half of the respondents (43.1%) reported having only basic awareness of neurodevelopmental disabilities, while 32.7% indicated having some knowledge. Only 10.9% reported good or extensive knowledge, and 12.4% had no knowledge at all.

Confidence levels in identifying and supporting learners with neurodevelopmental disabilities mirrored this pattern. About 36.1% of teachers described themselves as confident, as they indicated that they are receiving ongoing training,

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35.2% as neutral, while 28.7% indicated low confidence. Very few (7.4%) felt very confident in screening. While only 10.9% of teachers reported having good or extensive knowledge in screening, a considerably high proportion of teachers indicated confidence in screening. This discrepancy may suggest perceived confidence rather than actual competence in screening; it may also be attributed to confidence in informal screening methods rather than a structured identification process.

Teachers who were confident attributed this to observation of classroom behaviour and practical experience (7.4%), while those less confident cited limited training and inadequate knowledge (83.3%). A smaller number mentioned formal training, adaptation strategies, or moral commitment as influencing their confidence (12.9%).

Use of Digital Screening Tools

Digital screening for neurodevelopmental disabilities was not widely used. A total of 82.2% of respondents reported not using any phone, computer, or tablet tools, while 17.3% confirmed their use.

Among the few who had used digital tools, the most common were mobile applications (48.6%), followed by WhatsApp (22.9%), and online forms or quizzes (11.4%). These tools were mostly used sometimes (65.7%), with a few participants reporting frequent use.

When asked who typically used these tools in their schools, the majority were unsure (42.6%), while others identified special education coordinators (28.7%), teachers (18.3%), and resource teachers/teacher assistants (10.9%) as the main users. Despite limited use, most respondents (68.6%) believed that these tools were very helpful in identifying learners who need support, and a further 22.9% found them somewhat helpful.

Feedback on Screening Results

Feedback practices following screening were found to be inconsistent. A total of 41.1% of respondents reported that feedback following screening was not applicable, as no screening had been conducted for children in their classrooms, while 30% sometimes or generally received feedback. Only 8.9% reported receiving detailed feedback on screening outcomes. Feedback was most often communicated through verbal meetings (62%) or written reports (38%). The main providers of feedback were Special Education (SpED) officers (48.2%), followed by school heads (13.6%) and external specialists (11.1%). In terms of usefulness, over half of the overall respondents (56.9%) reported not receiving any feedback, while 25.7% found feedback very useful, and 8.4% considered it somewhat useful for guiding instructional or intervention planning. In sum, the findings from the first objective indicate that screening for neurodevelopmental disabilities is limited across schools. Most teachers possess only basic awareness and moderate confidence in identifying affected learners, with minimal access to digital screening tools. Paper-based methods remain dominant, and feedback mechanisms after screening are weak or inconsistent. While digital tools are viewed as potentially useful, their adoption and application in schools remain low.

Evidence from Focus Group Discussions

Consistent with the survey data, Special Education Division (SpED) from the Ghana Education Services describe screening as something that happens unevenly: when it is done, it relies on a Ghana Education Service/Ghana Health Service checklist plus simple practical tasks (drawing, matching, puzzles) and teacher observation. Screening is conducted by a team task when resources allow, but in everyday practice, teachers and special-education coordinators at the school/district level are the main actors. After screening, referrals to health facilities or specialists occur, and reports are expected back at school; where needs exceed

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school capacity, the division recommends special placements of specialists. Intervention planning (IEPs) is described as multidisciplinary in principle, involving teachers, parents, health professionals, and psychologists. In practice, planning and follow-ups are constrained by time, funding, and limited specialist involvement. Resource teachers, house-mothers (for boarding special schools), and parent engagement are identified as supports for implementation.

In sum, the triangulation of the quantitative and qualitative data provides a consistent picture. First, screening is sporadic, teacher-led, and largely manual. Second, digital adoption remains low, though teachers express openness to technological solutions. Third, feedback systems are weak, undermining follow-up and intervention quality. Fourth, teacher training and resources are critical enablers for improvement. Lastly, systemic and capacity barriers, rather than lack of awareness, appear as the primary obstacles to effective screening and intervention planning in urban Ghanaian schools. In practice, this means that the majority of learners with neurodevelopmental disabilities are not identified at all or identified late, resulting in delayed or absent individualised support. Additionally, the identification process relies on non-standardised methods.

B. Tech-Enabled Intervention Planning

Evidence from Survey Data

Participation in Individualised Education Plan (IEP) Development

The majority of respondents (82.7%) reported not having participated in the development of Individualised Education Plans (IEPs) for neurodivergent learners, while only 16.3% had done so. Among those who participated (N = 33), this participation most frequently involved parents (45.5%), teachers (42.4%), and special education teachers (36.4%). Collaboration with learners (33.3%), special education coordinators (27.3%), and health professionals (12.1%) was less common, while involvement of specialists such as psychologists and therapists was minimal (9.09%).

Use of Technology in Intervention Planning

Findings show that technology use in IEP development and intervention planning was limited. About 27.3% of respondents indicated no use of technology, while others reported using WhatsApp (24.2%), online IEP platforms (21.2%), and spreadsheets (18.2%). Fewer respondents mentioned learning management systems (15.2%) and assistive technology tools (12.1%). This indicates a reliance on basic communication platforms rather than specialised or integrated digital systems for intervention planning.

Collaboration Through Technology

Most respondents (52%) reported that they never collaborated using technology when planning interventions with others, such as teachers, parents, or specialists. About one-fifth (21.3%) reported collaborating sometimes, while very few did so often (8.4%) or always (2%). When asked about the perceived helpfulness of technology for collaboration, 25.7% described it as very helpful, 14.9% as helpful, and 24.3% were neutral. However, 34.7% provided no response, possibly reflecting limited experience with tech-enabled collaboration.

Alignment of Interventions with the National Curriculum

The Ghanaian national curriculum, developed by the National Council for Curriculum and Assessment (NaCCA), outlines learning outcomes across subjects and grade levels and promotes inclusive, learner-centred teaching. However, while the curriculum promotes inclusive teaching, respondents' reports indicate that guidance on individualised intervention planning is not always clear in practice, which may contribute to misalignment between school-based supports and formal curriculum structures.

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Nearly half of the respondents (47.5%) did not provide a response regarding curriculum alignment with practices. Among those who did, 20.3% stated their interventions were never aligned with the national curriculum, 12.9% said sometimes, 8.4% often, and only 6.9% reported always aligning their interventions. This suggests that most intervention efforts, like the use of task analysis, operate outside structured curriculum frameworks. This confirms that the majority of interventions operate outside structured curriculum frameworks.

Challenges in Using Technology for Intervention Planning

Respondents identified numerous barriers to using technology collaboratively. The most frequently cited challenges included lack of prior experience or participation (n = 49), network and connectivity issues (n = 31), unavailability of technological tools and materials (n = 17), and cost or funding constraints (n = 16). Other common issues included lack of training and low digital literacy (n = 13), power supply problems (n = 12), and stakeholder literacy barriers (n = 12). A smaller number mentioned a mismatch between technology and learner needs, time constraints, and low functionality of devices.

Suggestions for Improving Technology Use in Intervention Planning

When asked how technology could better support curriculum-aligned interventions, respondents emphasised the provision and accessibility of technological tools (n = 49) and the enhancement of learner engagement through technology (n = 31). Other key suggestions included integrating technology into the curriculum (n = 17), promoting research and data-driven practices (n = 16), and teacher training and professional development (n = 13). Respondents also highlighted the potential of assistive and AI-based tools (n = 12), personalised learning approaches (n = 12), and the development of specialised digital platforms (n = 11).

Evidence from the Focus Group Discussions

The qualitative findings reveal the causes: insufficient professional development, lack of institutional ICT systems, and infrastructural deficits. The combined evidence underscores the need for a systemic approach to digital inclusion, involving:

- capacity building in digital and inclusive pedagogies;
- provision of reliable ICT infrastructure; and
- embedding technology-based tools and data systems into national inclusive education frameworks.

The results in this section show minimal participation in IEP development and limited use of technology in intervention planning for neurodivergent learners. Collaboration through digital tools is rare, and where it occurs, it primarily involves general communication platforms such as WhatsApp rather than formal systems. Teachers acknowledged the potential of technology for improving collaboration and learner outcomes, but face major barriers such as limited access, inadequate training, poor infrastructure, and a lack of integration into the curriculum. Strengthening teacher capacity, improving resource availability, and embedding digital tools within national education frameworks are crucial for effective, curriculum-aligned interventions.

Participants reported that remote supervision and coaching occur, but such instances vary in frequency and form. The most-used modalities are phone calls, WhatsApp, and ad hoc messaging; occasional use of Google Meet was mentioned. Remote support is valued for instant feedback and rapid coaching when a teacher faces a classroom challenge. However, network/connectivity problems, unreliable follow-up from GES services (self-reported implementation may differ from actual practice), and limited resources reduce effectiveness. In-person visits and monitoring remain important for validation and deeper coaching.

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The triangulated analysis provides a cohesive picture of limited, informal, and under-resourced use of technology in intervention planning for neurodivergent learners. Both data sources indicate that Participation in IEP development was very low, and even when attempted, it lacked multidisciplinary collaboration. Also, technology use is basic and unstructured, dominated by communication platforms (e.g., WhatsApp) rather than specialised digital systems. Further, collaboration through technology is minimal, constrained by connectivity, device shortages, and inadequate training. Curriculum alignment is weak, with many interventions operating outside formal frameworks. Finally, Teachers recognise technology's potential, but practical barriers prevent meaningful integration.

C. Remote Supervision and UDL Implementation

Findings from Survey Data

Familiarity With Universal Design for Learning (UDL)

Participants demonstrated low levels of familiarity with the Universal Design for Learning (UDL) framework. About 40.6% had never heard of UDL, while 24.3% had only heard of it, and 22.3% reported being somewhat familiar. Only 10.4% were very familiar with the concept, and 2.5% did not respond. Training participation followed a similar trend. The majority (80.2%) of respondents reported no training on UDL principles, while 19.8% indicated they had received some form of training. Of those trained, the Ghana Education Service (GES) (30%) and the National Teaching Council (NTC) (17.5%) were the primary providers. Other organisations, including Chance for Childhood (12.5%) and international partners such as the German Foundation for Inclusive Education (2.5%), provided minimal training exposure.

Confidence in Applying UDL Principles

Findings show that confidence levels in applying UDL were generally low. About one-third of respondents (32.2%) were not confident at all, and 21.3% were slightly confident. Only 20.3% felt confident, 19.3% moderately confident, and a mere 4.5% were very confident in implementing UDL strategies in their teaching. A crosstabulation of characteristics and confidence analysis of factors influencing confidence revealed that training received (n = 54) was the most significant contributor to confidence, followed by availability of resources (n = 16) and teaching experience (n = 16). Conversely, lack of training (n = 46) and limited awareness of UDL (n = 19) were the main reasons for low confidence. Some respondents also mentioned structural challenges, large class sizes, and a lack of resources as barriers to effective UDL implementation.

Remote Supervision Experience

Remote supervision is a system of continuous professional development, support and feedback for teachers. The GES is responsible for providing supervision to teachers. The results indicate that remote supervision is not yet a common practice. Nearly half of the respondents (46.5%) had not received any supervision, and 42.6% reported that supervision occurred only in person. A small proportion (5.5%) received remote supervision, and 4.5% reported a combination of remote and in-person supervision. Where remote supervision existed, it was primarily delivered through phone calls (55%), followed by Google Meet (20%) and WhatsApp (15%). Most respondents received such support occasionally (65%), with very few reporting weekly or monthly sessions.

Helpfulness of Remote Supervision

Despite its limited use, remote supervision was generally viewed positively. A total of 75% of respondents who received supervision found it helpful or very helpful in understanding learners' needs, applying UDL principles, and modifying learning materials. This suggests that while the practice is uncommon, it has meaningful benefits when implemented effectively. Only 13.9% of respondents reported having facilitated

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supervision themselves. Those who did often used observation and feedback (55.6%), group supervision meetings (25.9%), and one-on-one sessions (22.2%), occasionally incorporating remote platforms.

Support Needs and Challenges in Remote Supervision

Respondents expressed a strong desire for enhanced support through remote supervision. The most requested forms of support included training and capacity building (N = 80), access to educational resources (N = 32), provision of digital tools and devices (N = 28), and UDL- or neurodiversity-specific guidance (N = 15). Additional needs included technical assistance, mentorship, and improved internet connectivity. However, significant barriers were also identified. These included lack of digital devices (N = 66), poor internet connectivity (N = 50), low ICT skills (N = 15), and insufficient teaching resources (N = 12). Other constraints, such as workload pressures, financial limitations, and institutional support gaps, further hindered participation in remote supervision.

Findings from this section reveal low levels of UDL familiarity, limited training opportunities, and minimal remote supervision practices among respondents. Although most educators expressed interest in using technology and remote support systems, they face multiple structural and capacity-related barriers. Those who had access to remote supervision or UDL-related training reported improved understanding of learners' needs and teaching strategies. The results underscore the need for systematic capacity-building initiatives, integration of UDL into professional development programs, and investment in digital infrastructure to facilitate effective remote supervision and inclusive teaching practices.

Thematic Analysis of Focus Group Discussions

Among the sample of the Special Education Division (SpED) participating in the focus group, UDL was partially known in practice through differentiated strategies and inclusive pedagogy, but full familiarity and formalised training were limited. Participants described capacity-building efforts (workshops, district training) and pilot initiatives; it was noted that many regular teachers have not received in-depth UDL training. Confidence in applying UDL was presented as variable; some teachers adapt materials and use differentiated groupings, while others lack resources, time, or explicit training to implement UDL consistently. Participants emphasised the need for more systemic training, resources and integration into routine supervision.

Triangulating both data sources indicates that familiarity and training in UDL remained low, but many teachers unknowingly employ related inclusive strategies. Further, confidence in applying UDL principles is directly tied to access to training, materials, and manageable class sizes. Also, remote supervision was emerging but irregular, conducted mostly through informal digital channels like phone and WhatsApp. Additionally, the value of remote supervision is high, but practical implementation is constrained by poor infrastructure and a lack of policy integration. Finally, teachers are willing and open to adopting UDL and remote supervision if provided with systematic training, resources, and institutional support.

DISCUSSION

The findings from this study confirm a significant gap between Ghana's commitment to inclusive education and its operational realities on the ground, based on insights from the three selected urban districts of the Greater Accra Region. The data collected provide a comprehensive landscape of the current state of screening and intervention planning in urban Ghana, the challenges of remote supervision, and the potential of UDL.

The most striking finding related to current practice is the profound deficit in professional capacity, with 80.7% of all respondents reporting no formal, specialised training in special needs

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education. The findings of the study further show that most experienced teachers have no further training in special needs education, whilst younger teachers appear to receive more training in special needs. These results are similar to findings by Opuku et al. (2022), who also noted that there is limited evidence regarding the presence of special educators who support learners with disabilities in schools in Ghana. Opuku et al. (2022) further highlight that special educators are unprepared to work, particularly in secondary schools, due to a lack of support and lack of adequate teaching and learning materials. The lack of sufficient resources and staff for the implementation of screening in other LMICs has also been identified in other studies (Marlow et al., 2019). For example, a study by Ntseto et al. (2021) also highlighted that teachers had inadequate training in screening, identification and assessment in the South African context. Another study also identified only one expert conducting assessments in a screening centre in the Ugandan context (Nakalule et al., 2025).

Another key point is that most teachers who highlighted that they were confident in screening learners were basing their confidence on non-formalised screening methods, such as classroom observations and their practical experience. Lack of formal training on standardised screening methods leads to inconsistencies in early identification (Ettel et al., 2016; Faruk et al., 2020). Teachers' perceived confidence in identifying needs must be underpinned by formal training, standardised tools and ongoing professional development to ensure reliability and accuracy in screening for neurodevelopmental conditions (Sepadi, 2025). These results align with broader evidence in LMIC contexts where formalised screening processes are usually non-existent (Hayes et al., 2018). The heavy reliance on informal teacher observation for identifying neurodevelopmental disabilities was also identified in a landscape review by Inclusive Development Partners (2022).

The study also identified that the incorporation of digital tools in screening still remains low. This has been attributed to weak digital infrastructure, limited access to internet-enabled devices, which is a challenge even for urban schools in Ghana and insufficient training. Evidence shows that while approaches such as tele-health and AI applications for children and adolescents with neurodevelopmental disabilities are promising, their integration still remains uneven (Imran et al., 2026).

Furthermore, the results of the study also showed that teachers rarely participated in IEP development and had limited knowledge on IEP development and the incorporation of technology in intervention planning for neurodivergent learners. Consistent with prior research, Rashid and Wong (2023), in their study, report that teachers demonstrate limited knowledge and understanding of Individualised Education Programmes (IEPs), particularly in relation to both conceptual clarity and practical implementation. Their findings suggest that many teachers lack adequate awareness of appropriate activities and instructional materials that can be used to meaningfully support and enrich the IEP process. This aligns with earlier research by Kozikoğlu and Albayrak (2022), who similarly found insufficient teacher knowledge regarding the IEP concept and its application in classroom practice. Furthermore, inconsistencies in teachers' interpretations and definitions of IEPs are also reported by Fu et al. (2018). Together, these findings suggest that limited teacher knowledge remains a persistent barrier to effective IEP implementation and highlight the need for sustained, practice-oriented professional development.

Another challenge identified in this study is a largely non-specialised teaching workforce (80.7% lacking formal training). This underscores the potential value of effective remote supervision. Such systems are essential not only for quality assurance but also for providing the continuous professional support and feedback that the general teaching population currently lacks. These findings align with broader LMIC evidence where teacher professional support and feedback

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systems remain uneven and underdeveloped (Popova et al., 2021). The results validate the urgent need to strengthen remote supervision and feedback systems.

The widespread low familiarity and limited confidence in applying the principles of UDL is directly correlated with the high percentage of teachers without formal special education training. Previous studies have also highlighted challenges in the application of UDL in Ghanaian classrooms, which include large class sizes, lack of teacher training on the principles and inadequate resources (Baffoe & Dako-Gyeke, 2020). The current capacity gap in the sampled schools suggests that teachers are ill-equipped to guide differentiated instruction, leading to the reported exclusion and unmet learning needs of neurodivergent learners. Collectively, the findings paint a picture of an inclusive education system struggling due to a systemic lack of specialised capacity and underdeveloped technological infrastructure for support.

Limitations

This study provides a robust mixed-methods evaluation of inclusive education practices in Ghana, yet its findings are subject to several limitations. Firstly, in terms of scope and generalizability, the research was restricted to only three school clusters in the urban districts of the Greater Accra Region. Consequently, the results may not be generalizable to rural populations in Ghana. Secondly, the study's methodology only relied on adult reporting from teachers, headteachers and Special Education Division staff. Therefore, the lived experiences of learners with neurodevelopmental conditions were not captured, which could have provided critical counterpoints to perspectives gathered from the professionals. Finally, the qualitative insights were collected from the Ghana Education Services, and the reliance on a single institution for perspectives regarding policy implementation and systemic challenges may provide narrow findings.

CONCLUSION

In conclusion, the findings highlight critical gaps in screening practices, teacher capacity, and technology integration that hinder effective inclusive education and individualised support for neurodivergent learners in Ghana. Furthermore, routine neurodevelopmental disability screening remains limited, largely paper-based, and inconsistent; this is also coupled with a heavy reliance on non-standardised screening practices. Another challenge identified is systemic barriers in relation to IEP development and collaboration, as the major stakeholders, such as parents and clinical professionals, including psychologists and therapists, are not actively involved. Additionally, feedback mechanisms are weak, and implementation of Universal Design for Learning (UDL) principles remains fragmented. To address these challenges, it is recommended that the Ministry of Education invest in digital screening tools, targeted teacher training, and data-driven monitoring systems. Integrating UDL principles into national education policies and teacher training curricula will also promote sustainable, inclusive education practices.

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