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Harnessing EdTech for Neurodivergent Learners in LMICS

A Rapid Evidence Synthesis

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Reviewers

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Abbreviations and acronyms

AAC	Alternative and Augmentative Communication
ADHD	Attention deficit hyperactivity disorder
DSM-5	The Diagnostic and Statistical Manual of Mental Disorders
LMICs	Low- and middle-income countries
NGO	Non-governmental organisation

1. Introduction

As neurodivergent learners continue to face multifaceted challenges that affect their education (see ↑El-Salahi et al., 2023; ↑Truman et al., 2021), education systems, environments, and practices have struggled to address their needs adequately. This rapid evidence synthesis explores the current state of evidence regarding the use of educational technologies (EdTech) for neurodivergent learners in low-and middle-income countries (LMICs). The review was conducted in two phases to offer complementary insights on the topic. The first phase presents the findings regarding the use of EdTech for neurodivergent learners in LMICs. The second phase expands the focus, offering evidence and examples that extend beyond LMICs, providing a global perspective on how EdTech could be applied and adapted to LMICs to address different challenges faced by neurodivergent learners. The review framework for EdTech for neurodivergence provides insights and recommendations regarding the potential of EdTech in optimising systems, environments, and education practices.

1.1. Understanding neurodivergence

There are many ways in which individuals' neurological development can manifest. Neurodevelopmental conditions refer to some of the ways in which development can result in divergent cognitive processes (↑Black et al., 2024). "Mental functioning or brain type that diverges from the norm" is referred to as 'neurodivergent' (↑Chapman, 2021, in ↑Castleman et al., 2024, p. 217). Neurodivergent individuals are those who have a range of neurocognitive variants such as dyslexia, dyscalculia, dyspraxia, attention deficit hyperactivity disorder (ADHD), autism, and Tourette's syndrome (↑Clouder et al., 2020). These individuals may be seen as having a 'hidden disability' as they rarely have a physical manifestation or physical markers of visible disability (↑Couzens et al., 2015). Despite the increased awareness of neurodivergence around the globe, very little is currently known about the prevalence and experiences of neurodivergent individuals in LMICs (see ↑Bitta et al., 2018). The available evidence suggests a limited understanding and awareness of some neurodivergent conditions across several LMICs (↑Aderinto et al., 2023; ↑Chowdhury et al., 2024; ↑Greer et al., 2022). This can be attributed to superstitious beliefs and societal stigma attached to neurodevelopmental conditions, lack of awareness, and inadequate diagnostic and assessment tools (↑Adams, 2024; ↑Greer et al., 2022). For instance, a review conducted by ↑Adams (2024) suggested that South Africans and Nigerians show diverse perspectives and attitudes that

significantly influence the provision of autism treatment. Parents of neurodivergent children in LMICs were reported to face several challenges. In Bangladesh, parents caring for a child with autism were found to experience stress and anxiety that are exacerbated by stigma and avoidance exhibited by society (↑Uddin & Ashrafun, 2023).

The conceptualisation of disability (including neurodivergent conditions) has long been debated as an initiative of high-income countries, and neurodiversity has been largely understood through knowledge (research and consensus) conducted and developed in these countries (↑Manase, 2024; ↑Peruzzo & Allan, 2024). Studies conducted in recent years recommend re-evaluating the neurodiversity terminology with the aim of decolonising disability studies (↑Chataika & Goodley, 2024; ↑Peruzzo & Allan, 2024). Thus, to 'Africanise neurodiversity', ↑Manase (2024) suggests integrating local knowledge with that from high-income countries, while focusing on African local realities and ways of living. Thus, there is a pressing need to address how neurodivergent conditions are viewed and addressed in research conducted in LMICs. It is worth highlighting that published research from LMICs does not focus on neurodivergence as a whole, but rather focuses on specific neurodivergent conditions such as autism and ADHD.

However, equally recently, a paradigm shift has resulted in valuing and celebrating diversity in neurological functioning (↑Black et al., 2024). Further, emphasising equitable and quality education, particularly for marginalised groups, Sustainable Development Goal 4 (SDG4) reinforces the focus on promoting the inclusion of neurodivergent learners. In a similar vein, the increase in diagnoses of neurodivergent learners and their enrolment in schools has resulted in a greater focus on adapting and refining education practices and approaches (↑Littlefair et al., 2024). Nevertheless, neurodivergent learners continue to face many barriers in the form of attitudes, practices, policies, and systems that hinder their access to education worldwide.

1.2. Challenges faced by neurodivergent learners

A large and growing body of literature has demonstrated that neurodivergent learners have lower school participation, poorer academic performance, higher exclusion rates, and face stigma and isolation (↑Black et al., 2024; ↑Brake, 2024; ↑Littlefair et al., 2024). These challenges stem from several multifaceted and interconnected factors and can be divided into 'intrinsic' and 'contextual' challenges. While the intrinsic challenges are

similar globally, some contextual (extrinsic) challenges pertain to LMIC contexts alone (↑Samadi, 2022).

Intrinsic challenges are rooted in the psychological and cognitive difficulties exhibited by neurodivergent individuals. Previous research has established that neurodivergent learners manifest attention and focus difficulties (↑Dwyer et al., 2024). Furthermore, sensory sensitivity and communication difficulties are some of the challenges that affect the learning experience of neurodivergent individuals (↑Jones et al., 2020; ↑Sturrock et al., 2022). Another functional difficulty associated with neurodivergence is cognitive functioning, which has been found to affect students' focus, motivation, and learning (↑Le Cunff et al., 2024). Research has shown that neurodivergent students face executive functioning difficulties such as difficulties with cognitive flexibility, planning and organisation, and emotional control (↑Safer-Lichtenstein et al., 2024). Recent research has reported gross and fine motor delays in neurodivergent children (↑Mohd Nordin et al., 2021). Also, research evidence has demonstrated that neurodivergent conditions are associated with poor mental health (↑Terlich et al., 2024). Regardless of intrinsic difficulties, the neurodiversity approach outlines that each neurodivergent individual is different and possesses several cognitive strengths (see ↑Doyle, 2020). This principle suggests that the barriers to the education of neurodivergent children extend beyond their individual difficulties.

Research has demonstrated that some of the challenges faced by neurodivergent learners emerge from the environment, social structures, societal responses to neurodivergence, and other contextual factors. In the context of LMICs, considerable evidence has accumulated to show the challenges that neurodivergent children face regarding identification, assessment, and diagnosis. For instance, research suggests that autistic individuals in many African countries face delayed diagnosis, inadequate diagnosis, and identification challenges. As a result, the neurodiversity of many children remains undetected and unsupported (↑Abubakar et al., 2022; ↑Kantawala et al., 2023). Further, research conducted in South Africa, Tanzania, Kenya, and other LMICs highlights a lack of resources, experienced personnel, teacher professional development opportunities, training in neurodivergence and special educational needs and disabilities (SEND), as well as a lack of understanding neurodivergence by teachers, as key challenges that affect the learning of neurodivergent learners in the region (↑McConkey, 2022; ↑Mpangane et al., 2024; ↑Ndunguru & Kisanga, 2023). Barriers to education and inclusion in the form of attitudes have also been identified in the literature. Several studies have suggested that

autistic children face stigma and negative attitudes in many sub-Saharan African countries, such as Nigeria and South Africa, which demonstrates a lack of awareness of neurodiversity in the region (↑Adams, 2024; ↑Ruparelia et al., 2016). In school settings, research has outlined a lack of cooperation and support from parents and caregivers and a lack of collaboration between parents and schools in countries such as Tanzania, Ghana, and Kenya (↑Abubakar et al., 2022; ↑Ndunguru & Kisanga, 2023; ↑Senoo et al., 2024).

To address these challenges, it is important to explore effective practices that can support neurodivergent learners in LMICs to address both *intrinsic* challenges to learning and *contextual* ones. One strategy that has proven effective in supporting learners to overcome barriers to inclusion is the integration of EdTech (↑Navas-Bonilla et al., 2025). However, little is known about how EdTech is currently used in LMICs to support neurodivergent learners.

1.3. Research Questions

Considering the challenges that neurodivergent children face in LMICs and the potential of EdTech, the present review seeks to address the following research questions:

- How is EdTech currently being used to support neurodivergent children in LMICs?
- How could EdTech be leveraged to support neurodivergent children overcoming the different challenges they face in LMICs in the future?

2. EdTech for neurodivergence: Available evidence

The initial phase of the review aims to address the first research question. This section outlines the methodology as well as the findings of the reviewed evidence regarding the use of EdTech for neurodivergent learners in LMICs.

2.1. Methodology

A rapid scan of evidence is considered an approach that allows for an evidence synthesis to present timely evidence to decision-makers (↑Tricco et al., 2022). The present scan was informed by the Cochrane rapid reviews interim guidance from the Cochrane rapid reviews methods group (↑Garritty et al., 2021). This approach operates under the principles of transparency in data collection and analysis and reliability of findings to strive for quality (↑Castro Arteaga et al., 2022).

The process followed for this scan included setting the research questions and the eligibility criteria, searching the selected databases, study selection (title and abstract screening followed by full-text screening), data extraction, and data analysis (see Figure 1 below). The scan was undertaken between December 2024 and February 2025.

2.1.1. Literature search

The study protocol involved reviewing academic as well as grey literature to explore the current evidence regarding the use of EdTech for neurodivergence in LMICs. A hybrid approach to literature searching was adopted to identify relevant resources given the paucity of evidence. The hybrid search strategy involved integrating at least two approaches to literature searching (↑Wohlin et al., 2022). First, Google Scholar, Scopus, Web of Science, and EdTech Hub's searchable databases served as the main search engines. Next, a snowballing strategy was adopted to search references and/or citations included in studies of the previous searches to identify relevant studies. The search strategy involved using keywords related to EdTech, neurodivergence, and LMIC settings (see Table 1 below). The keywords related to EdTech describe different EdTech tools and strategies, and keywords related to neurodivergence include neurodivergent conditions. In a similar vein, the LMIC terminology includes countries based on the World Bank Group's list.

Table 1. *List of keywords used in the literature search*

Search category	Terminology
EdTech	*Mobile Technologies*
	Tablet technologies
	Computer technologies
	Educational software
	Educational apps
	Assistive technologies
	Information and communication technology (ICT) tools
	Alternative and Augmentative Communication (AAC)
Neurodivergence	*Dyslexia*
	Dyscalculia
	Dyspraxia
	Attention deficit hyperactivity disorder (ADHD)
	Autism
	Tourette's syndrome
	Neurodivergence
	Neurodevelopmental conditions
LMICs	*All LMIC countries, based on the World Bank Group's list*

2.1.2. Screening and eligibility criteria

Initially, 17 studies were identified for screening. After removing duplicates and screening the studies for relevance (see Table 2 below), only 11 papers were selected for final full-text screening. In addition, two more studies

were included following the snowballing search strategy. Thus, 13 studies met the inclusion criteria and were retained for analysis.

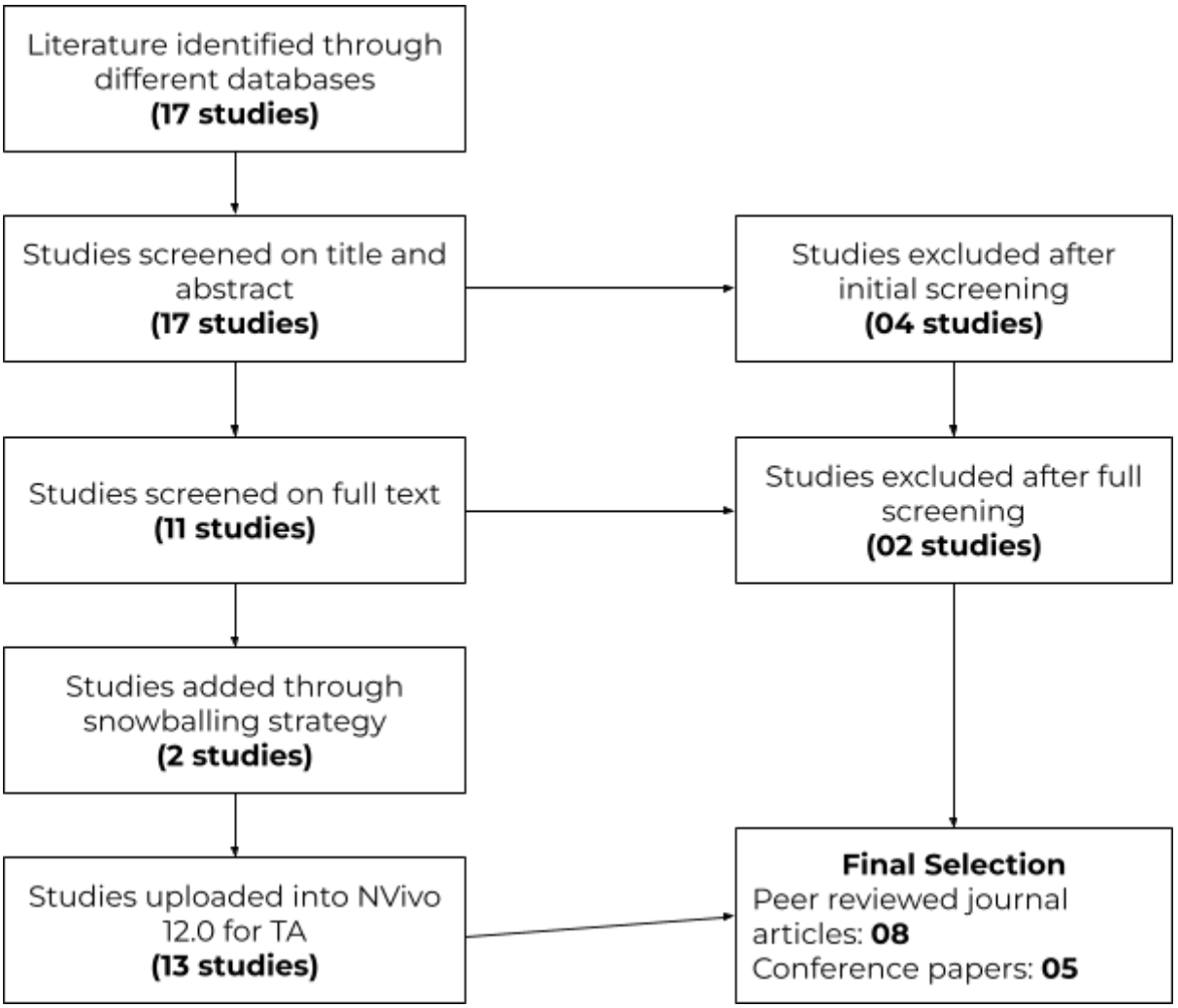
Table 2. *Eligibility criteria for the literature search*

Quality	Inclusion criteria
Geographical location	LMICs based on the World Bank group list
Population	Neurodivergent learners (dyslexia, dyscalculia, dyspraxia, attention deficit hyperactivity disorder (ADHD), autism and Tourette's syndrome).
Date	2010–2025
Study design	All studies that describe the use of a particular EdTech for neurodivergent learners.
Language	English
Literature type	All

2.1.3. Literature analysis and synthesis

The retained studies were uploaded into NVivo 12.0 software for analysis. A thematic analysis approach to data analysis was adopted (↑Braun & Clarke, 2006; ↑2022). The six steps of TA were followed to analyse the data. Next, the findings were synthesised narratively (↑Garritty et al., 2021). As a result, four main themes were generated from the data.

Figure 1. *Literature search and screening process*



2.2. Findings

As highlighted above, 13 studies were analysed to synthesise evidence regarding the use of EdTech for neurodivergent learners in LMICs (see Annex). This section presents the findings of the literature analysed, adopting a narrative synthesis through thematic analysis. The findings are presented in four main themes, alongside explanations drawn from the existing evidence.

- The first theme outlines findings regarding the context of the reviewed studies and shows that few examples of research on the use of EdTech for neurodivergent individuals exist in LMICs. Most of these studies were conducted in Asia.
- The second theme presents the focus of EdTech for neurodivergence studies conducted in LMICs. This theme outlines that the reviewed

studies lack input from neurodivergent learners, parents, and teachers.

- The third theme highlights that most of the reviewed studies focus on a specific neurodivergent condition, which is autism.
- The fourth theme shows that the reviewed studies focus on early identification and early developmental skills as the main area of EdTech tools.

2.2.1. Few examples of research on EdTech for neurodivergent learners exist in LMICs, and most of these are in Asia

The reviewed studies represent some of the efforts undertaken in some LMICs to integrate EdTech in health and education domains with the aim of promoting the inclusion of neurodivergent individuals. The findings suggest that the sparsity of evidence applies both to the situation of neurodivergent learners in LMICs (see ↑Bitta et al., 2018) and the broader application of EdTech in supporting neurodivergent learners in the region. The reviewed work was undertaken in Asia (n = 11) and Africa (n = 2) and reflects the inequitable distribution of studies. The data suggests that a substantial amount of research undertaken to explore the use of EdTech for neurodivergent learners is happening in Asia (India, n = 5; Bangladesh, n= 4; Pakistan, n = 1, Malaysia, n = 1), with a much more limited amount taking place in Africa (Rwanda, n = 1; Tanzania, n = 1). This is the case despite the number of initiatives undertaken to integrate technologies in the education sector in many African countries.

2.2.2. Studies focus on developing and/or testing EdTech, with limited stakeholder input

The studies reviewed adopted a number of research designs, such as feasibility studies (n = 7), case studies (n = 1), and technology design proposals (n = 5). While most of the empirical studies reviewed (n = 8) included individuals with neurodivergent conditions to test the suggested EdTech tool, only a few studies sought input from teachers, learners, and/or parents. Only one of these studies adopted a participatory approach to involve children, teachers, and parents in the design of the technology. This accords with previous research suggesting a paucity of evidence regarding stakeholder engagement, input, and perceptions of technology effectiveness (↑Chugh et al., 2023). This highlights the need to incorporate the voices of neurodivergent learners and their families in

designing and implementing EdTech to create empowering learning opportunities for all learners. Further, most of the reviewed studies involved a short period of testing and included very limited details regarding the cost, accessibility, and language of the suggested EdTech tools, making it difficult to draw firm conclusions.

2.2.3. Most studies conducted on EdTech for neurodivergent learners are centred on autism

Most of the reviewed studies (n = 12) concentrated on autism. Despite the overall paucity of evidence regarding autism in LMICs (↑Adams, 2024), autism emerged as a central focus of the reviewed studies. This suggests an increased awareness of autism as a neurodivergent condition in LMICs, and the reviewed studies contribute to our understanding of autism in LMICs. However, this suggests that other neurodivergent conditions may be overlooked or are underrepresented in research conducted in the region.

One possible explanation for the focus on autism is the visibility of the condition compared to other neurodivergent conditions. For instance, research has shown that communication difficulties, restricted and repetitive behaviours, and sensory behaviours are often physically expressed by autistic learners (↑Turnock et al., 2022). Thus, visible autistic traits may have contributed to the increased focus on autism in research in LMICs. Another possible explanation is the comorbidity of autism with other neurodivergent conditions such as ADHD and anxiety disorders (↑Cherewick & Matergia, 2024). Research suggests that, following the diagnostic classifications presented in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5), which is a classification of mental disorders with associated criteria designed to facilitate diagnoses (↑American Psychiatric Association, 2013), clearly categorising each of the neurodivergent conditions has proven challenging (see ↑Bonti et al., 2024). Thus, the intersection of autism with other conditions may have contributed to the increased attention and recognition of autism. It should be noted that a Text Revision of the DSM-5 has been published (DSM5-TR) offering "addition of diagnostic entities and symptom codes; changes in diagnostic criteria or specifier definitions; updated terminology; and comprehensive text updates" (↑First et al., 2022, p. 218). Nevertheless, a paucity of evidence on the effects of DSM-5 TR on autism categorisation remains. The increased prevalence of autism, historical advocacy groups

and advocacy movements, and media representation are other possible factors that have increased the visibility of autism.

2.2.4. Most studies focus on tech tools to identify and screen individuals, neglecting intersection with wider systems

Analysis of the reviewed studies demonstrated a focus on developing and evaluating mobile software applications (apps, n = 9), online platforms (n = 2), and Augmented Reality (AR) and Alternative and Augmentative Communication (AAC) tools (n = 2). This accords with previous studies demonstrating the proliferation and availability of mobile apps (↑Hinze et al., 2023). Studies reviewed focus on a few key use cases of EdTech support for neurodivergent learners, such as autism identification, individualised early learning, and (in one case) training for teachers to support autistic learners.

The main area addressed was autism identification, screening, monitoring, and assessment (n = 6). The reviewed studies propose and/or evaluate EdTech tools that provide alternative means of screening and assessment. Nevertheless, only a few of these studies reported a valuable contribution of the EdTech tools under scrutiny for the early identification of autism. Regarding the learning of autistic children, some of the reviewed studies present EdTech tools with the aim of promoting pre-school readiness, numeracy skills, joint attention skills, and communication skills (n = 6). However, many of these studies propose EdTech tools for autistic learners based on theoretical analysis and lack empirical validation of the tools.

Further, only one study focuses on the use of EdTech to provide teachers' training in autism. The study reports a positive impact of EdTech training on teachers' participation rates and overall interest in autism training. This shows a limited focus on using EdTech to support teachers working with neurodivergent learners. Available evidence in the literature suggests a lack of professional development opportunities for teachers of neurodivergent learners. Furthermore, a lack of teachers' knowledge and understanding of neurodivergence is highlighted as a key challenge that hinders the education of neurodivergent individuals in LMICs. Nevertheless, only one of the reviewed studies focuses on the use of EdTech to train teachers.

This suggests that much of the research conducted in the region is centred on the *individual* neurodivergent learner. This focus tends to isolate the learner without considering how the nature and complexity of the environment shape the development and education of the neurodivergent

learner. Thus, there is a pressing need for research that accounts for the intersection between neurodivergence and the multidimensional nature of influences on neurodivergent learners' development.

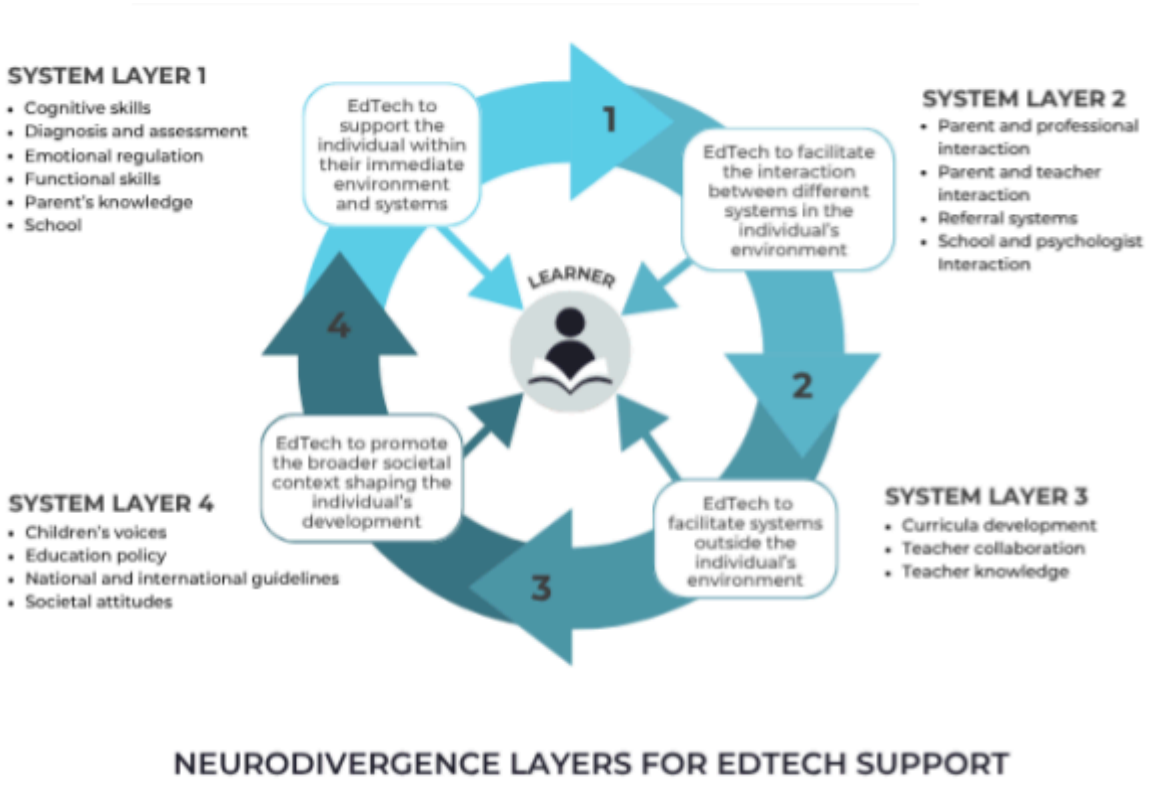
Further, promoting the development of neurodivergent learners is realised through systems that promote collaboration between parents, teachers, schools, and educators. However, very limited evidence is available in the reviewed studies regarding how technology could facilitate collaboration between different systems and stakeholders. The literature review suggests a lack of cooperation and support from parents and other teachers in LMICs (↑Abubakar et al., 2022). Thus, future research should focus on the use of EdTech to promote the development of neurodivergent learners by facilitating collaboration between teachers and parents. A holistic approach to EdTech for neurodivergence in LMICs is needed to inform EdTech design and implementation research.

3. A holistic EdTech framework for neurodivergence

This phase of the study aims to answer the second research question: "How could EdTech be leveraged to support neurodivergent children overcoming the different challenges they face in LMICs in the future?" Based on Bronfenbrenner's bioecological systems theory (↑Bronfenbrenner, 2005), this section offers a holistic framework of 'EdTech for neurodivergence'. This framework underlines areas where EdTech could be used to support neurodivergent learners (see Figure 2 below), and provides some examples from contexts in the Global North.

Placing the neurodivergent learner at the centre, this framework examines the developmental patterns of neurodivergent children over time, the interplay between these patterns and the environment, and how EdTech tools can support these interactions between individuals and their environment. The framework consists of four main system layers that describe the development of neurodivergent learners and how different systems shape their development. The framework shows that the neurodivergent child's development is shaped by interactions within these interconnected system layers in their environment.

Figure 2. *EdTech for neurodivergence framework: An illustration of key areas in the development of neurodivergent learners that EdTech can support*



3.1. System Layer 1: EdTech to support individuals within their environment and systems

This system layer demonstrates the potential of technology to support neurodivergent individuals and facilitate their interactions with their environment. This involves a focus on identifying neurodivergent individuals, addressing their functional difficulties, fostering their strengths, and providing support to immediate members in the individual's circle. Some of these areas have been thoroughly examined by previous research, while others remain underresearched. As discussed in Section 2, emerging evidence suggests that EdTech is used to support neurodivergence identification, screening, and diagnosis. According to ↑Mukherjee et al. (2024), digital tools can potentially address early identification challenges in autistic children as they are accessible, can measure autism-related phenotypes, and can be administered by non-specialists in a learner's immediate environment. Furthermore, EdTech tools showed great potential when used to address areas in which neurodivergent learners present greater difficulty. For instance, assistive technology apps proved useful in enhancing social and language skills, emotional regulation, attention, and working memory (↑Doulou et al., 2025; ↑Kim & Lee, 2025; ↑Wong et al., 2023; ↑Wojciechowski & Al-Musawi, 2017). Regarding the learning experience, technology proved effective in offering personalised learning activities, feedback, and assessment in LMICs (see ↑Major et al., 2021). Another example of how EdTech could be used to promote inclusive education of neurodivergent children is provided in a study conducted by ↑Sobel et al. (2024). The authors designed, developed, and evaluated a tablet app called Incloodle-Classroom, which serves as a coordinative artefact that promotes equitable participation, engagement, and social and emotional learning. The study indicated that this tool structured the children's participation and allowed them to learn about and interact with each other socially. Another study introduced an EdTech app designed to enhance basic cognitive skills (memory, object identification, and word processing) in neurodivergent individuals (↑Ganju et al., 2024). However, much less evidence is available about how EdTech can be used to support other individuals within the learner's environment (e.g., supporting parents' and caregivers' understanding of neurodivergence). Thus, further research is needed to explore the use of EdTech to promote the development of neurodivergent learners by supporting individuals within their environments.

Summary of promising use cases: identification of neurodivergence, enhancement of individual social and emotional skills, fostering inclusive participation, and improved cognitive skills.

3.2. System Layer 2: EdTech to facilitate interaction between different systems in an individual's environment

The literature suggests that the lack of collaboration between teachers and parents is a key challenge affecting the development of neurodivergent children in LMICs. At this system layer, EdTech can contribute to learners' development by facilitating the interaction between broader community systems and networks. Previous research indicates that parent and school interactions, as well as parental involvement, promote academic outcomes and psychological adjustment of neurodivergent children, such as autistic children (↑Avnet et al., 2019; ↑Hou et al., 2023). EdTech tools can be instrumental in facilitating teacher and parent interaction, fostering parental involvement (↑Blau & Hameiri, 2017; ↑Woodhouse et al., 2024), as well as shaping parent and professional interactions (↑Dalmaijer et al., 2023). For instance, technology could be used to facilitate parent and professional communication about neurodivergence identification, assessment, and diagnosis. Research from high-income countries demonstrates that electronic health record (EHR)-linked software has been effective in facilitating information sharing about ADHD between parents and teachers (↑Michel et al., 2018). Nevertheless, more research is needed to investigate the use of EdTech to facilitate communication between professionals and schools, as well as between professionals and parents. Ensuring effective interactions between individuals and services in their environment is crucial for promoting a holistic understanding of neurodivergence and providing consistent support for neurodivergent individuals.

Summary of promising use cases: promote parent and teacher interaction and information sharing.

3.3. System Layer 3: EdTech to facilitate systems outside an individual's environment

At this system layer, EdTech tools could be used to support systems that are outside a learner's environment but which can still influence their development. For instance, teachers, schools, and policies can influence the

learning of neurodivergent individuals. Technology offers promising teacher professional development opportunities in LMICs (↑Hennessy et al., 2022) and could be used to support teachers' knowledge and understanding of different neurodivergent conditions (↑Hart & More, 2013). For instance, EdTech tools could be used to provide neurodivergence training and virtual coaching. A study conducted in Australia showed that the use of a web-based model of practice increased teachers' interest in learning about autism and inclusive learning (↑Bruck et al., 2021). However, the use of EdTech to promote teachers' collaboration and peer mentoring has not been investigated. Thus, future research should focus on how EdTech could support teachers to share best practices and teaching experiences in relation to neurodivergence. Moreover, technology could be integrated into curricula development in various forms such as digital platforms, online and collaborative resources, personalised learning, and assessment (↑Mustakim et al., 2024). Although limited, available evidence suggests a positive influence of integrating technology into curricula development. For instance, ↑Yeh & Meng (2020) show the effectiveness of a virtual reality social skills course in boosting the social skills of autistic students.

Summary of promising use cases: teacher training and virtual coaching, and curricula development.

3.4. System Layer 4: EdTech to promote the broader societal context shaping the individual's development

This system layer consists of societal and cultural factors that influence an individual's development. EdTech could play a significant role in raising awareness of neurodivergence, extending the scope of support beyond neurodivergent individuals and those immediately connected to them. For instance, researchers in the field suggested the adoption of the 'celebratory technology for neurodiversity' paradigm (↑Boyd & Zolyomi, 2024). This paradigm acknowledges neurodiversity as an integral part of human reality. In addition, EdTech could shape inclusive policy as well as national and international education guidelines. For instance, EdTech could be used to improve data-driven decision-making (↑Hossin et al., 2023) and to enable input from neurodivergent learners, their teachers, and their parents. Further, research shows that neurodivergent individuals face high unemployment rates (↑Davies et al., 2023), and technology holds potential in facilitating the recruitment process of these individuals. For instance,

technology could be adopted to support the accessibility and employability of neurodivergent individuals through offering accessible job listings and flexible interview formats. Available evidence from high-income countries suggests the effectiveness of applied cognitive technology in supporting neurodivergent individuals to better achieve employment-related outcomes (↑Damianidou et al., 2019). However, less evidence is available regarding the use of EdTech to improve the workplace for neurodivergent employees, who are known to encounter a range of difficulties (↑Nash, 2024).

Summary of promising use cases: supporting employment-related outcomes.

4. Synthesis and conclusions

This rapid evidence synthesis has sought to investigate the use of technology for neurodivergent learners in LMICs. This section discusses the key conclusions to emerge from the findings and, drawing on the EdTech for neurodivergence holistic framework, presents the study's implications.

Investing in research to understand neurodivergence based on local realities is essential for supporting neurodivergent learners with EdTech in LMICs

Our findings demonstrate that evidence on how EdTech is currently used to support neurodivergent learners in LMICs is limited, with most of the available studies focusing on Asia. There is a need to invest in research into supporting the needs of neurodivergent learners through EdTech in LMICs in general and African settings in particular. This is important to ensure that EdTech is designed and implemented in a way that aligns with local realities and cultural norms.

EdTech implementation in LMICs should be grounded in robust evidence of effectiveness

Although the majority of the reviewed studies focus on testing EdTech tools, very limited attention has been paid to the empirical validation of the effectiveness of the tools. The lack of empirical evidence regarding the effectiveness of the suggested EdTech tools could mean that we cannot rely on these tools with confidence. Thus, governments, educational institutions, technology developers, and non-governmental organisations (NGOs) should invest in evaluation research to collect data-driven evidence regarding the effectiveness of EdTech tools in supporting the learning of neurodivergent learners in LMICs.

EdTech design and/or implementation should prioritise incorporating stakeholders' voices

The reviewed studies have overlooked the importance of integrating input from teachers, parents, and neurodivergent learners. The lack of representation of neurodivergent learners' voices in technology design and/or implementation could shape the use of EdTech tools in ways that may overlook their strengths and needs. For this reason, EdTech developers, researchers, education institutions, governments, and NGOs should engage with key stakeholders to incorporate their input into EdTech design and implementation. This could involve integrating

materials and features that suit their strengths and needs, culturally responsive resources, community values, and neurodiversity content and examples. Research shows that it is critical for neurodivergent learners to see themselves represented in their learning materials (↑Webber et al., 2024). Pertaining to stakeholders' voices, there is a need to explore the EdTech experiences of neurodivergent learners and their parents and teachers.

The potential of EdTech in supporting neurodivergent learners should not be restricted by an exclusive focus on autism

While neurodivergence encompasses a wide range of neurological differences, most of the reviewed studies focused on designing and evaluating tech tools for autistic learners. Although this shows an increased awareness of autism, it may result in overlooking the needs of learners with other forms of neurodivergence, which sometimes coexist with autism. For instance, this may result in developing tech tools, policies, and interventions that are tailored primarily to suit the needs of autistic individuals only. Policymakers, researchers, NGOs, and governments should ensure that funding, research plans, and EdTech tools are inclusive for *all* neurodivergent learners. This finding also signals a need for more implementation practices with the aim of raising awareness of neurodivergence in LMICs. This should include engaging policymakers, teachers, parents, NGOs, and EdTech developers in discussions about EdTech for neurodivergent learners.

EdTech plays a positive role in neurodivergent learners' development, extending beyond identification and assessment

The reviewed studies demonstrated a focus on designing and implementing technologies to support autism identification, assessment, and diagnosis. However, there is a need to investigate how different EdTech tools could be used to support other areas of development for neurodivergent learners. For instance, a focus on how EdTech could support learners' functional difficulties is needed. Given that research in the field shows that neurodivergent learners face mental health difficulties (↑Terlich et al., 2024), the impact of EdTech tools on the mental health of neurodivergent learners should be examined and considered in EdTech design and implementation.

Considering the holistic role of EdTech in dismantling barriers to learning is key for future research and implementation endeavours

The reviewed studies demonstrate a focus on the individual learner, which can lead to pathologising neurodivergence and placing the responsibility for success and/or failure on the individual learner. This perspective may overlook the broader environmental, societal, and contextual factors influencing neurodivergent learners. This suggests a need for more focus on the role of EdTech beyond the individual learner, considering the broader, holistic impact of technology and its role in dismantling barriers to learning. For instance, a focus should be given to using EdTech to support parents and caregivers of neurodivergent children. Given that the literature outlines the lack of teachers' professional development opportunities and the lack of collaboration between schools and families as key challenges faced by neurodivergent learners in LMICs, focus should be given to implementing EdTech to promote teachers' understanding of neurodivergence, parent and teacher collaboration, and awareness of neurodivergence within communities and societies.

The EdTech for neurodivergence framework presented in this report helps to outline the areas of development for neurodivergent learners and the potential applications of EdTech. It shows that EdTech could be used to support neurodivergent learners at different stages of their lives, from early identification and personalised education to raising awareness, shaping policy, and facilitating employment. The framework suggests that EdTech tools have the potential to promote inclusive education systems, which emphasise the need to design and implement practices that meet the needs of all learners. Based on this framework, evidence from contexts in high-income countries suggests that the following use cases for supporting neurodivergent learners with EdTech could be effective:

- **System Layer 1 (summary of promising use cases):** identification of neurodivergence, enhancement of individual social emotional skills, fostering inclusive participation and improved cognitive skills.
- **System Layer 2 (summary of promising use cases):** promote parent and teacher interaction and information sharing.
- **System Layer 3 (summary of promising use cases):** teachers' training and virtual coaching, and curricula development.

- **System Layer 4 (summary of promising use cases):** support employment-related outcomes.

More research and application of these use cases in LMICs should be considered to promote the development and education of neurodivergent learners.

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Annex: Description of the analysed studies

Study	Country	Neuro-divergent condition	Tech tool	Focus / area
Autism identification and learning through motor gesture patterns (↑Rafique et al., 2019)	Pakistan	Autism	Android app	Autism identification and learning
Mobile application based early educational intervention for children with autism – a pilot trial (↑Mazumdar et al., 2023)	India	Autism	Mobile app	Pre-school readiness
Development of a mobile app to improve numeracy skills of children with autism spectrum disorder: Participatory design and usability study (↑Ntalindwa et al., 2021)	Rwanda	Autism	Mobile app	Numeracy skills
Feasibility of a mobile phone training on autism spectrum disorders for teachers in Tanzania (↑Martino & Naqvi, 2023)	Tanzania	Autism	Online training platform accessed via mobile phones	Autism training for teachers

Prottoy: A smart phone based mobile application to detect autism of children in Bangladesh (↑Satu et al., 2019)	Bangladesh	Autism	Mobile app	Autism screening
Portable joint attention skill training platform for children with autism (↑Jyoti & Lahiri, 2022)	India	Autism	TABlet-based Joint Attention Task (TABJAT) platform	Joint attention skill
Enabling technology integrated learning for autistic children using augmented reality based cognitive rehabilitation (↑Abdullah et al., 2024)	India	Autism	Augmented Reality	Cognitive rehabilitation
Using tactile letters as an assistive technology in teaching alphabet for dyslexic children: a case study (↑Mohamad & Abdullah, 2017)	Malaysia	Dyslexia	Mobile app	Recognising alphabet and pronunciation

Autism Barta — A smart device based automated autism screening tool for Bangladesh (↑Bardhan et al., 2016)	Bangladesh	Autism	Mobile app	Autism screening
HELLO: An android-based mobile application for autism individuals to improve socio-communicational learnability in Bangladesh (↑Jahan Yra et al., 2022)	Bangladesh	Autism	Mobile app	Socio-communicational learnability
ILAT (Software as a Service): Interactive learning application tool for autism screening and assessment in children with autism spectrum disorder (↑Arivuselvan et al., 2022)	India	Autism	Mobile app	Autism screening and assessment
iPad: Efficacy of electronic devices to help children with autism spectrum disorder to communicate in the classroom (↑Sankardas & Rajanahally, 2017)	India	Autism	Alternative and Augmentative Communication (AAC)	Communication

Grant report on mCARE: Mobile-based care for children with autism spectrum disorder (ASD) for Low- and Middle-Income Countries (LMICs) (↑Haque et al., 2021)	Bangladesh	Autism	Mobile app	Monitoring autism