Supporting learners who have special educational needs: how and why using digital technologies, including generative artificial intelligence, can help.

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1 Introduction

The first Northern Ireland (NI) Department of Education policy objective for special educational needs (SEN) is that "schools can meet the needs of pupils with SEN and teachers, and support staff, are supported to implement **child-centred, effective, evidence-based** interventions" (Department of Education, 2025, p.15) This paper addresses some specific child-centred, effective and evidence-based practices in the adoption and use of digital technologies, including generative artificial intelligence (GenAI), to support young people in special schools (7,462 in NI in 2025) in the areas of communication and interaction, cognition and learning, social, emotional, and mental health difficulties, and sensory and/or physical needs. While multiple special needs presented in the examples here will not necessarily be found in all schools, specific aspects could well be encountered and may therefore be relevant to support inclusion for learners with special needs in mainstream classroom (58,211 in NI in 2025) and in specialist provision in mainstream schools (4,559 in Ni in 2025)[1].

With a thirty-five-year legacy of a centrally managed ICT infrastructure providing equitable ICT services in all primary, post-primary and special school (Passey, 2024), and the piloting of GenAI tools for schools (Taggart & Roulston, 2025), NI is fertile ground for innovative practices to emerge, to be shared and emulated, especially when compared with practices in other jurisdictions.

Flowing from a recent independent review of education in NI (Independent Review of Education, 2023), an end-to-end revision of the curriculum and assessment (Crehan, 2025) is underway, and an SEN reform agenda has been published (Department of Education, ibid). At the same time, interest in applying the principles of Universal Design for Learning to support learners (CAST, 2025) is attracting the engagement of a growing, cohort of teachers.

2 International research on GenAI uses for special and additional needs

The proportions of learners with additional or special needs are increasing (Whitford, 2025). In this context, recent research (Whitford, 2025) identifies forms of GenAI that have been reported to support learners with additional needs. To support fine motor

[1] Data in this paragraph from: Special Educational Needs/Disability Reform Agenda, Department of Education (2025). https://www.education-ni.gov.uk/publications/sen-reform-agenda

disability, a text-to-image generator has been used to create content from ideas; for anxiety or stress, a chatbot assistant has offered advice and supported personal discussion; for autistic spectrum disorder, an avatar or humanoid robot has supported social skills and conversation; for attention deficit hyperactivity disorder, an AI-assisted task manager has helped to develop plans and timeframes for action; for visual impairment, a chatbot assistant has supported conversation, has created content, described images and helped with proofreading, while a speech-to-text generator has created text from speech; for those with English as an additional language, a chatbot assistant has supported conversation, translated from and to English, provided summaries as well as supporting grammar and sentence structure; and for dyslexia, a chatbot assistant has summarised text, as well as reviewing grammatical, spelling and word-level errors.

Other literature reviews, however, whilst showing positive outcomes, highlight some concerns. Wang, Tlili, Khribi, Lo, and Huang (2025), from a review of studies, found that most of the studies focused on uses of GenAI that supported emotion and attention through mediation activities, that GenAI was used commonly as a pedagogical assistant, that positive statistical significance was not clear, and that concerns were raised about ethical, competency, and technical aspects. In the context of uses of GenAI to support neurodivergent students, Ronksley-Pavia, Nguyen, Wheeley, Rose, Neumann, Bigum, and Neumann (2025) concluded from their literature review that GenAI had "potential to provide real-time, personalized support for students as well as reducing administrative burdens for educators. However, notable concerns emerged regarding information accuracy, over-reliance on GenAI, privacy considerations, and the need for human oversight" (p.1).

3 Evaluation of GenAI examples in use in NI special schools.

In NI, special schools are using GenAI innovatively to support learners with additional or special needs. The following sections (i) summarise use cases stemming from the evaluation of a proof-of-concept project, and (ii) illustrate use evidence from one special school. Both sections are accompanied by links to several video case studies.

3.1 NI Education Authority GenAI Proof-of-Concept project

The Education Authority's (EA) Education Information Solutions (EdIS) programme established two GenAI "proof-of-concept" projects, supported by Microsoft[2] (MS) and Google[3], in which 194 participants, across all school types, developed 1,220 'use cases' across aspects of education in schools, from administration to curriculum and

[2] https://www.youtube.com/watch?v=5O8_fpCya40&list=PLiluTszfwwMIfO-AFOEsmJI22A3RgWd5O
[3] https://www.youtube.com/watch?v=oouEQqwiqWw

assessment, saving an average of between 10 and 12 hours in teacher workload per participant per week.

Taggart and Roulston's (2025) independent evaluation showed that some teachers using MS Copilot were reporting increases in teacher uses of GenAI to support learners with special needs. Notably most participants within this study taught within mainstream schooling with only 3.2% respondents working within special school contexts.

Participants in this study reported a 12.6% increase in weekly use of GenAI to support SEN learners, with 90% of respondents rating the impact on SEN as beneficial/highly beneficial. It was reported how GenAI was enhancing learning through, for example, adaptive assessments and innovative content creation for individual needs, enhancing accessibility and reducing disparities in educational experiences for children with SEN.

Use cases were categorised by participants from a variety of contexts to be impactful for learners with special educational needs. Teachers reported that MS Copilot was particularly valuable for synthesising complex information, producing concise summaries for colleagues, and generating targeted resources. Reported applications included condensing multi-agency reports into accessible bullet-point formats for subject teachers, adapting lesson plans for learners with specific learning needs, and producing materials such as social stories and risk assessments. Some staff involved in managing SEN interventions also described using MS Copilot to support formal processes, for example by drafting letters for appeals or rewording individual education plans to improve clarity. The timesaving on administrative tasks supports teachers and releases their time to focus more on addressing needs in the classroom.

By contrast, Google Gemini was frequently associated with classroom-based adaptation and accessibility. Teachers highlighted uses such as producing differentiated worksheets, generating personalised reading materials, creating bilingual or simplified resources, and adapting content into audio or visual formats. Voice-to-text functionality was also employed during SEN meetings, with Google Gemini subsequently used to structure the notes into actionable plans. Several teachers reported employing Google Gemini to develop home–school resources aligned with report comments or specific targets for learners.

Overall, teacher accounts suggest that MS Copilot was predominantly used for the distillation of professional documentation into clear, actionable outputs, while Google Gemini was closely linked to multimodal classroom adaptation and integration with collaborative platforms such as Google Classroom.

3.2 The NI Schools ICT Excellence Awards

Established in 2015, schools apply for annual competitive awards against judging criteria and a scoring rubric. Five judges independently assess 2,000-word entries and, following amalgamation of scores, select approximately 15 of the highest scoring entries to be visited (approximately 20% of entries) to evaluate the evidence of excellence in the use of digital technologies and, individually again, to re-score each school to select winning, highly commended and finalist entries. Typically, five special schools enter annually (13% of all 39 special schools). The application of GenAI emerged in entries in 2025.

Clifton Special School, a recipient of the ICT Excellence Awards in two years (Smith & Anderson, 2024, 2025), serves learners aged 3 to 19 years with a wide range of severe and profound learning difficulties. Many experience complex interactions of medical needs and limited verbal communication, requiring significant support to meet their holistic needs. The school demonstrates exemplary practice in the application of GenAI, for learners who may otherwise have no conventional means of expressing themselves, giving "*learners … both a voice and choices*" (Smith & Anderson, 2025, section 4.2.4). The teachers aim to enrich communication of the learners' emotions, thoughts, and ideas through digital art and music demonstrating how technology, when applied with care and purpose, can unlock potential and amplify learner voice.

The teachers apply GenAI to streamline administrative and record-keeping tasks, releasing valuable time to develop comprehensive, individualised needs assessments. These assessments, co-created with staff and parents, help identify where digital technologies and the application of GenAI may have the most significant impact for each individual learner.

For learners with profound and multiple learning difficulties, many of whom are non-verbal, GenAI applications have opened new pathways for communication and creativity. Historically, creating artwork required 'hand-over-hand' assistance, and music-making was often inaccessible. Now, by combining eye gaze and body-tracking technology, touch screens and GenAI tools, learners can interact with digital content using their eyes and their movements. They can, for example, express preferences, make choices over words and objects, pick colours, images and sounds, and sequence storylines to create musical compositions. This combination of technologies enables them to describe and design their own creations; artwork that reflects their ideas, and music that resonates with their emotions. A GenAI composition tool brings these visions to life, allowing the learners to produce original pieces that are unmistakably theirs. These are not approximations of their intent, they are authentic expressions of self.[4] This shift from passive participation to active creation is having a profound impact. The

[4] Link to the learners' composition here: https://tinyurl.com/2x2dxurn

learners are no longer recipients of experiences; they are authors of their own stories, composers of their own songs, and artists of their own visions. Teachers report increased engagement, empowerment, joy, and pride. The classroom becomes a space of shared discovery, where every learner is seen, heard, and valued. Parents, carers and the wider community are moved by performances and exhibitions, reinforcing the school's culture of inclusion and respect.

Clifton's approach exemplifies how GenAI, when thoughtfully embedded, transforms education. It empowers learners with complex needs to participate meaningfully, make choices, and share and celebrate their achievements. It shifts the notion of inclusion from that of bringing learners into a system to that of reshaping a system to honour every learner's voice.

4 Conclusion

It is clear from both research and practice evidence that using GenAI can support learners with specific or additional needs. However, whilst the concerns and challenges of using GenAI should always be considered in each educational context, there are principles that could apply in any of those contexts (building on the work of Whitford, 2025):

- GenAI tools can support the individual – but the specific or additional needs of the individual need to be recognised carefully.
- Additionally, the use of any GenAI tool needs to be carefully trialled with the individual before wider use is considered.
- Motor disabilities might be supported by text-to-image, speech-to-text or eye-tracking movement choice tools.
- Hearing disabilities might be supported by voice-to-text tools.
- Visual disabilities might be supported by speech-to-text or chatbot assistant tools.
- Anxiety, stress and autism spectrum disorders might be supported by chatbot assistants, avatars or humanoid robots.
- Attention deficit hyperactivity disorder might be supported by AI-assisted task management tools.
- Language limitations might be supported by chatbot assistants.
- Dyslexia might be supported by chatbot assistants, spelling or grammar checking tools.

GenAI has been shown to support learners with specific and additional needs, both through cases reported from practices developed in schools and those researched through specific methodological lenses. Examples of applications supporting communication and interaction (language limitations), cognition and learning (dyslexia), social, emotional, and mental health difficulties (anxiety, stress, autism spectrum

disorder, and attention deficit hyperactivity disorder), and sensory and/or physical needs (motor, hearing and visual disabilities) are all worthy of being shared in ways that teachers can consider applying in their own contexts.

However, Mollick (2024) has argued that the artificial intelligence available now represents only the earliest and least capable versions we will ever encounter, with future systems set to be considerably more advanced. For teachers and education stakeholders, this signals both opportunity and responsibility. The opportunity to harness GenAI in ways that enrich teaching, learning, and accessibility, and the responsibility to ensure these tools are implemented ethically, inclusively, and effectively. For learner inclusion, the potential affordances are significant. These range from personalised support and adaptive content to communication aids that can foster independence and agency. These benefits, however, will only be realised if teachers are prepared through sustained professional learning, collaborative experimentation, and critical and system-wide reflection. As GenAI continues to evolve, so too must professional learning opportunities and competence frameworks, ensuring that every learner can benefit equitably from the most advanced and supportive affordances of digital technologies.

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