

Systematic review of the evidence to support expert practice in the education and care of children and young people with special educational needs and disability in the UK

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Scopus, EBSCO, ERIC and British Education Index were interrogated in a systematic review of primary research since 2014 addressing expert practice and outcomes in education and care for young people with special educational needs and disability in the UK. Grey literature and studies of medical settings, preschool children, mainstream education or professional education were excluded. Quality was gauged by effect sizes, risk of bias and the Critical Appraisal Skills Programme. The search identified 7058 items. Twenty-eight studies were included, with 1839 participants of 4–22 years. Risk of bias was low, with effect sizes from small to extremely large. The qualitative studies were rigorous. Expert practice with positive outcomes was evidenced in comprehensive assessment, enhancing engagement and personalised interventions. Correction of visual problems, use of humanoid robots, and tested models were generally effective. There was rigorous evidence for efficacy of frameworks and reasonable evidence for creative approaches to physical activity. Drama lessons were valued. Standing frame use improved peer interaction or caused segregation. Disparity between problem identification and planned support in education health and care plans, and addressing personal and physical health factors were problematic. The voice of young people was lacking. More training was required in augmented and alternative communication.

Introduction

This systematic review investigated the evidence for expert practice and its outcomes in the United Kingdom (UK) in the education and care of children and young

people with special educational needs and disability (SEND). It was structured by the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) framework (Moher, Liberati, Tetzlaff, et al., 2009). The review was restricted to the UK because of the significant differences internationally in terminology, practices and structure of provision and also in order to inform an associated study of expert practice and outcomes specifically in the UK. It should be helpful to practitioners in schools and care organisations as well as to other researchers in the field.

Terminology

A disability is defined as ‘a physical or mental impairment that has a substantial and long-term adverse effect on your ability to carry out day-to-day activities’ (UK Equality Act, 2010, Chapter 1 Section 6). The International Classification of Diseases 11 (ICD-11) defines intellectual disability (previously referred to as learning disability) as atypical cognitive development (World Health Organisation, 2018, 6A00). There remains disparity in formal definition of terms such as learning difficulty and learning difficulty. For example, in the USA, there is a tendency to differentiate between a learning difficulty and a specific learning disorder (SLD) based on general and specific academic impairments, respectively. In the UK, it is not common to make this differentiation unless the SLD is identifiable by standardised testing (Foundation for People with Learning Disabilities, 2020). However, there is a consensus these do not affect general intelligence, representing instead an overall cognitive impairment (Foundation for People with Learning Disabilities, 2020; National Institute for Health and Care Excellence, 2015). SLDs are often responsive to classroom-based learning interventions such as those implemented for dyslexia (Pumfrey, Pumfrey, and Reason, 2013). When presenting results in this review, the terminology used in the reported study was retained.

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Special education

A child's physical and/or intellectual impairment may necessitate special education provision such as state-funded or self-maintained special school. The latest UK government statistics estimated the number of children in state-funded special schools at 128 100, with almost 3800 in non-maintained special schools; both increased from the previous year (Department for Education (DfE), 2020).

Mainstream schools pursue the same outcome goals for all pupils. The focus on academic success is apparent in academic and behavioural targets. Special schools are often more individualistic, with academic achievement tailored specifically to the individual child and their talents or interests. There is also an increased focus on life skills and independence, with smaller class sizes to allow for better interaction with teachers and learning support assistants. The school setting itself is often more purpose-built with facilities to cater to all of the needs of disabled children and not just their educational needs (Birtenshaw Group, 2020). Australian parents cited improved well-being as a factor in the decision to move their children from mainstream to special school. Exclusionary culture in mainstream school aggravated existing emotional strain (Mann, Cuskelly, and Moni, 2018).

Children with intellectual disability are more likely than typically developing peers to develop psychiatric disorders (Whitaker and Read, 2006). There may be comorbid depression and anxiety (Simonoff, Pickles, Charman, et al., 2008). For American adults with physical disability, depression was the most common secondary condition (Kemp, 2006). With this in mind, allowing disabled children to experience life at its fullest is of paramount concern in order to reduce the development of psychiatric disorder in childhood and beyond. To this end, special education should be holistic, with well-being as a core focus.

Expert practice and outcomes

The seminal work of Ericsson and associates (Ericsson, Hoffman, Kozbelt, et al., 2018; Ericsson, Krampe, and Tesch-Romer, 1993) prompted a new era of research into the nature of 'deliberate practice', founded on the notion that expertise could be achieved only through a prolonged period of intensive practice; innate talent or inherited factors being discounted entirely. Deliberate practice was characterised by reproducible and persistently superior performance. This approach has been expanded to unpick the component parts of expert practice as teachers' tasks. In the Netherlands, a systematic review by van Dijk, van Tartwijk, van der Schaaf, et al. (2020) identified six such tasks, together with a further three dimensions related to university teachers' development of these tasks. There were performing tasks better, expanding performance to a greater variety of tasks, and carrying out tasks in a wider

sphere of influence. Clearly, these proposals focus on process rather than outcomes.

An alternative approach in educational psychology to define expert practice has been to identify the differences between experts and novices. Scandinavian researchers used video recordings of problematic classroom events to investigate differential responses between expert and novice teachers. Novices focussed more on classroom behaviour and discipline, while experts prioritised student learning and the teacher's role in influencing developing events (Wolff, Jarodzka, and Boshuizen, 2017). A meta-analysis by researchers from the UK and Turkey (Anderson and Taner, 2022) established that expert teachers were more critically reflexive on their practice, sought to support colleagues more often and demonstrated lifelong learning activity more than other teachers. They were flexible in classroom management, had strong pedagogical knowledge and engaged students in the choice of content and activities. The impact of such expertise was not detailed, the focus remaining on process.

Hambrick, Oswald, Altmann, et al. (2014) suggested that both the 'deliberate practice' and the 'individual differences' approaches to expert practice failed to address the phenomenon adequately, and a much wider understanding of factors and context was necessary. Such an attempt was made by Macrae (2018), identifying perception of key issues in the classroom; the ability to predict the outcomes of a range of actions; finesse in execution of actions with deep thought of multiple factors; and the ability to focus selectively on complex, chaotic environments as indicators of 'expertise as actions'. Knowledge of the curriculum as a learning journey; acknowledging the impact on individual pupils; accessing extensive knowledge of pedagogy; and engaging in effective self-reflection were declared to be aspects of 'mental models' that were central to expert practice. These were all to be effected while conserving the complexity of fluidity of knowledge and context as well as personal values. Outcomes were hinted at (in the impact on pupils), but process remained the main focus.

A previous literature review suggested no clear indications of either special school or mainstream school having better outcomes for disabled children (Shaw, 2017). Within mainstream and special schools, provision for children and subsequent impact are not homogenous. As a result, it is possible that the quality of either source of provision or the severity of impairment may be determining factors of individual outcomes. This review was designed to assess the available evidence of expert practice in the education and care of children and young people with special educational needs and disability in the UK, together with associated outcomes. This will inform an associated realist evaluation to identify expert practice in SEND services, the factors that bring about positive

outcomes, and the context in which achievement is made possible.

Method

Search strategy and selection of studies

A comprehensive literature search was conducted using relevant web-based databases (Scopus, EBSCO, ERIC, British Education Index). Given the mixed nature of the evidence, with some intervention studies and more observational or qualitative studies, a Population, Exposure, Outcomes (PEO) approach was adopted to formulate the review question and the search for evidence (Bettany-Saltikov, 2012).

What evidence is there of expert practice in the education and care (E) of children and young people with special educational needs and disability in the UK (P), and how might this provide more positive physical, educational or behavioural outcomes (O)?

Terms. The search terms *education, special, needs, expert, practice, children, young, people, impairment, physical, learning, disability, complex, health and autism* were applied to the title, abstract or full paper. The conjunction 'and' together with the logical operators 'in', 'with' and 'for' were also used, along with the disjunction 'or' (Table 1).

At initial screening, titles were assessed to ensure that they included at least one of the search terms. Duplicates were removed. Following this, the abstracts of the remaining returns were assessed for eligibility. If abstracts were deemed relevant, then the full text of the paper was acquired. If not relevant, they were excluded. Exclusion criteria were applied in reviewing the full text. The

reference sections of eligible full-text papers were screened to identify any further eligible items. Reference lists from literature reviews and meta-analyses published within the defined time frame were hand-searched for other eligible studies. Unpublished and grey literature were not included. Reports published in languages other than English would have been excluded, but there were none.

Inclusion criteria

Items had to be reports of primary studies in the UK addressing the education and/or care of children and young people (<25 years) with special educational needs or disability (acknowledging international variation in nomenclature). They had to report expert practice in education and care for this population, and they were published in English in peer-reviewed journals. The search was limited to studies published after 2014 because of changes in special needs education policy in the UK at this time (DfE, 2014).

Reports detailing relevant influence of policy and practice in special education on outcomes for children or young people were included. Comparisons between typically developing children and disabled children were included if data were suitably disaggregated. Reports focused on the impact of professional views and approaches to educating children with SEND were included to illuminate the application of specific practices (Table 2).

Exclusion criteria

Unpublished studies, dissertations, theses and other grey literature were excluded. Studies detailing care primarily in medical settings rather than education and care were excluded. Those focussed on preschool children, solely mainstream education professional education (without

Table 1: Search terms with Boolean operators

Practice	Children and Young people	Disability	Not relevant publication	Not relevant terms
Expert	Children	Autism	Health	Hospital
AND	OR	OR	OR	OR
Practice	Young	Physical	Medical	Inpatient
IN	AND	OR	OR	OR
Education	FOR	People	WITH	Learning
OR				Policy
Care				OR
				OR
				International
				OR
				Impairment
				OR
				Severe
				OR
				Difficulty

Table 2: Inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
Focused on children and young people (<25 years) with special educational needs and/or disability	Studies of typically developing children and disabled children, or of childhood and adulthood, in which disaggregation of data is not possible.
Focused on special education and care OR on expert practice in this area	Focus primarily on medical settings
Details outcomes for children or young people	
Primary research	
Presented in English	
Published after 2014	
Focused on any part of the UK	

details of outcomes for children and young people), and mixed sample studies in which data about the target population could not be disaggregated were also excluded.

Primary outcome measures

This review aimed to assess practice in the education and care of children and young people with special educational needs and disability. The primary outcome measure for empirical studies was efficacy of delivered interventions.

Analyses of effect sizes

Where data were available, between-group and within-group effect sizes (Cohen's *d*) were calculated using the difference between the pre-test and post-test results (within-group effect size) or the difference between the control and intervention group post-test results (between-group effect size) and dividing by the pooled standard deviation. Effect sizes of ≤ 0.2 were deemed to be small, 0.5 to be moderate, and $0.8 \geq$ to be large (Cohen, 1988, 1992).

Quality assessment

The quality of empirical studies was assessed using Cochrane's Risk of Bias Assessment Tool (Higgins, Altman, Gøtzsche, et al., 2011). However, the blinding criterion was excluded since blinding was not possible when participants and data were organised by disability status or employment title. Cochrane's risk of bias categorises studies as high, medium, or low risk; unclear (no clear risk indicator); or not applicable (Table 3). The quality of other studies was assessed using the Critical Appraisal Skills Programme Qualitative Research Checklist (CASP, 2018; Table 4).

Results

Outcome of the selection process

In total, 7058 items were identified for inclusion. The reference lists of previous systematic reviews were hand-searched for other eligible studies that met the inclusion criteria; however, none were identified. After removal of duplicates, 6173 records were considered for screening by title only. Largely due to lack of inclusion of key terms or lack of UK focus, 5288 items were excluded. The abstracts of the remaining 885 items were then assessed in detail for eligibility against inclusion and exclusion criteria. This removed 755 items, especially because of inapplicable population (preschool or mainstream schooling), or being conducted in other countries. The remaining 130 items were deemed eligible for full-text review using the same criteria. A further 102 papers were excluded at this stage due to inability to segregate data by applicable age group, being economy- or policy-based reports, or not being based on UK data. This left a total of 28 studies to be included in the review (Figure 1). LC led on searching, screening, data extraction and appraisal of papers. TL and AW reviewed these processes independently. Consensus was reached through discussion in the case of conflicting perspectives.

Characteristics of included study (Table 5)

There were 16 empirical studies, 10 qualitative studies, and two mixed methods studies. The 28 studies included a total of 1839 participants (inexact numbers were reported in one qualitative study).

Risk of bias

All studies were deemed to be of low risk when assessed against the Cochrane's Risk of Bias tool (Higgins, et al., 2011). However, some studies contained elements of risk. Of the intervention studies in which effect size for significant outcomes could be calculated, a range from small to extremely large was seen (0.15–2.93). Details of the outcomes of quality assessment of empirical studies are displayed in Table 4.

All studies concerning behaviour and engagement reported low sample sizes except for Black, McConnell, McKerr, et al. (2019) who were successful in recruiting over half the school population. Studies by Black, et al. (2019) and McKerr, McConnell, Black, et al. (2020) raised the concern of other sources of bias, these being respectively unequal gender split and the possible introduction of demand characteristics. No data on effect sizes were provided by McKerr, et al. (2020) or Pilling and Little (2020). Young, Dagnan, and Jahoda (2016) reported medium effect sizes, while Rudnick, Davies, Bacarese-Hamilton, et al. (2015) and Lambert-Lee, Jones, O'Sullivan, et al. (2015) reported small to large effect sizes across varied outcomes. When exploring behaviour and engagement interventions in education, Black, et al. (2019) reported consistently large

Table 3: Risk of bias assessment

Study	Random sequence generation	Allocation concealment	Incomplete outcome data	Selective reporting	Other biases
Van Herwegen, et al. (2019)	Not Applicable	Not Applicable Professionals (n = 141; 95% female) working with children with ASD (n = 77), DS (n = 26) and WS (n = 38).	High Risk All participants completed the survey in its entirety, but frequent instances of missing data (more so for those working with ASD rather than with WS or DS).	Low Risk All outcomes were reported.	High Risk Unequal gender split (95% female)
Ruddick, et al. (2015)	Not applicable Participants grouped dependent on their status as either teacher or parent	Not Applicable	Low Risk Results did not detail incomplete or missing data.	Low Risk All outcome data were reported.	Low Risk No other bias identified.
Black, McConnell, McKerr, et al. (2019)	Not Applicable	Not Applicable 59.7% consent rate	Low Risk Data complete	Low Risk All outcome data reported	High Risk (70% male)
Norburn, et al. (2016)	Low Risk To negate demand characteristics participants who were already enrolled in similar research were excluded.	Not Applicable	Low Risk 40% response rate. All completed in full.	Low Risk All outcome data were reported.	Low Risk No other bias identified.
Lambert-Lee, et al. (2015)	Not Applicable	Not Applicable	High Risk High attrition rate (57%)	Low Risk All outcome data were reported.	Low Risk No other bias identified.
Hedgecock, et al. (2014)	Unclear Participating children were selected by participating teachers. Teachers recruited from those that attended a demonstration of the robot.	Not Applicable	Low Risk Results did not detail incomplete or missing data.	Low Risk All outcome data were reported. Unplanned outcomes reported as the study evolved.	Low Risk No other bias identified.
Pilling and Little (2020)	Not Applicable	Not Applicable	Low Risk Results did not detail incomplete or missing data.	Low Risk All outcome data were reported.	Low Risk No other bias identified.
Place, et al. (2015)	Low Risk 100 parent participants were chosen at random from those who consented.	Unclear No mention of allocation concealment.	Low Risk Results did not detail incomplete or missing data.	Low Risk All outcome data were reported.	Low Risk No other bias identified.

(Continued)

Table 3: (Continued)

Study	Random sequence generation	Allocation concealment	Incomplete outcome data	Selective reporting	Other biases
Tobin and Ebbels (2019)	Low Risk Participants were not randomised due to the nature of the study	Unclear No mention of allocation concealment.	Low Risk Results did not detail incomplete or missing data.	Low Risk All outcome data were reported.	Low Risk No other bias identified.
Rees, et al. (2017) (Quantitative arm of mixed methods study)	Low Risk Opportunistic sample used. 6 Senior managers (audit of curricular practice) 24 teaching staff, senior managers and support staff (questionnaire). 8 teaching staff and Senior managers (interview).	Not Applicable	Low Risk Results did not detail incomplete or missing data.	Low Risk All outcome data were reported.	Low Risk No other bias identified.
Gutman, et al. (2018)	Low Risk Four cohorts determined by school start date (n = 36)	Not Applicable	Low Risk Results did not detail incomplete or missing data.	Low Risk All outcome data were reported.	High Risk Study funded by the participating school
Stelmaszczyk (2018)	Not Applicable Narrative case study. There were no participants in this study.	Not Applicable	Not Applicable No outcome data	Not Applicable No outcome data	High Risk
Ebbels, et al. (2017)	Not Applicable	Low Risk Allocation of SLT was concealed in the vocabulary project.	Low Risk Results did not detail incomplete or missing data.	Low Risk All outcome data were reported.	Low Risk No other bias identified.
Herring, et al. (2019)	Low Risk Those with previous experience of this or similar interventions were excluded to negate demand characteristics.	Not Applicable	Low Risk Results did not detail incomplete or missing data.	Low Risk All outcome data were reported.	Low Risk No other bias identified.
Castro, Grande, and Palikara (2019)	Not Applicable	Not Applicable	Low risk Results did not detail incomplete or missing data	Low risk All outcomes reported	High risk Unequal gender split (girls = 69; boys = 167)
McKerr, et al. (2020)	Not applicable	Not Applicable	Low risk Results did not detail incomplete or missing data	Low risk All outcomes reported	High risk Participants chosen from a larger study

(Continued)

Table 3: (Continued)

Study	Random sequence generation	Allocation concealment	Incomplete outcome data	Selective reporting	Other biases
Pearlman and Michaels (2019)	Not Applicable	Not Applicable	High risk Many cases of missing data	Low risk All outcomes reported	Low Risk No other bias identified
Young, et al. (2016) (Quantitative arm of mixed methods study)	Not Applicable	Not Applicable	Low risk Results did not detail incomplete or missing data	Low risk All outcomes reported	Low Risk No other bias identified

effect sizes for improvement in concentration. Hedgecock, Standen, Beer, et al. (2014) also reported large effect sizes when measuring engagement in classroom-based tasks. From the quality assessment, it can be suggested that Black, et al.'s (2019) study was of the highest quality in the area of behaviour and engagement due to the large sample size, large effect size and lack of other bias; while McKerr, et al.'s (2020) study had a low sample size, unreported effect sizes of outcome measures, and other sources of bias.

The studies focussed on language and communication raised no concerns regarding other bias. Herring, Grindle, and Kovshoff (2019) did not report effect sizes. Pearlman and Michaels (2019) reported medium effect sizes, and both Ebbels, Wright, Brockbank, et al. (2017) and Tobin and Ebbels (2019) reported large effect sizes. The optimum study was by Tobin and Ebbels (2019), reporting significant clinical effect sizes and providing substantial evidence.

Neither of the two studies investigating professional views and health outcomes (Place, Dickinson, and Reynolds, 2015; Van Herwegen, Ashworth, and Palikara, 2019) provided sufficient data for effect sizes to be calculated. In the first of these, the possibility of bias due to an unequal participant gender split was raised. Despite this, both studies provided a valuable contribution and direction for future research.

Four studies reported the efficacy of frameworks of provision (Castro, Grande, and Palikara, 2019; Gutman, Vorhaus, Burrows, et al., 2018; Rees, Tully, and Ferguson, 2017; Stelmaszczyk, 2018). The risk elements related to lack of detail of the researcher's relationship with participants and of the recruitment strategy. The Rees et al study produced large effect sizes of positive outcomes and exploited different methods of data collection to enhance validity. One study produced overall low-risk and good-quality evidence for practice (Castro, et al., 2019), yet improved rigour could have been achieved by collating evidence beyond a single city's local authorities. One study showed risk of other bias as it was funded by the school from which the sample was taken (Gutman, et al., 2018). However, the results of the framework evidence were positive with moderate to large effect sizes and could be influential for other organisations. Stelmaszczyk's (2018) narrative case study was deemed to be high-risk and lower-quality research as this provided only a single viewpoint of the framework effectiveness without providing quantifiable data as evidence or opinions of those involved (students and staff of the school).

Assessment of other studies

Appraisal of qualitative studies is summarised in Table 5. Six studies did not detail the recruitment strategy fully (Davis, Carter, Myers, et al., 2018; Franklin and

Table 4: Qualitative quality assessment

Study	Clear statement of aims	Appropriate qualitative methodology	Appropriate to address research aims	Appropriate recruitment strategy	Data collection addresses research issue	Researcher/participant relationship considered	Ethical issues considered	Sufficiently rigorous data analysis	Clear statement of findings	Is the research valuable
Goodwin, et al. (2019)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Downs, et al. (2014)	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	Yes	Yes
Pierce and Maher (2020)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maher (2020)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maher and Fitzgerald (2020)	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Franklin and Goff (2019)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loyd (2015)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Davis, et al. (2018)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Greathead, et al. (2016)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

(Continued)

Table 4: (Continued)

Study	Clear statement of aims	Appropriate qualitative methodology	Appropriate to address research aims	Appropriate recruitment strategy	Data collection addresses research issue	Researcher/participant relationship considered	Ethical issues considered	Sufficiently rigorous data analysis	Clear statement of findings	Is the research valuable
Crombie, et al. (2014)	Identify implicit practice not assessed by Ofsted	Case study with narrative observation, engagement profiles	Yes	Yes	Yes	Researchers were school staff except 1 educational psychologist employed for the project	Not discussed	Data were analysed with reference to a framework	Clear	Evidence of unconscious professional practice
Gaona, et al., (2020)	Yes Compare provision described in EHCP and the aspirations of young people with ASD	Yes Documentary analysis	Yes	Yes Purposeful sampling of EHCPs for 12 children diagnosed with ASD	Yes	Not Applicable No face-to-face contact with pupils	Yes Ethical approval from university	Yes Systematic analysis using ICF-CY codes to analyse the content of 12 EHCPs	Yes	Yes Implications for involving CYP with ASD in the production of their EHCP, re-transition to post-16 education & employment
Young, et al. (2016)	Yes Explore adolescent concerns: with and without ID	Yes Structured interviews for CYP with ID	Yes	Yes Students recruited from local authority schools	Yes GAS-ID & Weschler scale	Unclear Not discussed	Yes Ethical approval from university	Yes	Yes All had high-level distress & anxiety before school transition	Yes Implications for those providing transition & anxiety support
Rees, et al. (2017)	Yes Framework evaluation of mixed methods study	Yes Semi-structured interview, questionnaire Audit of curricular practice	Yes	Unclear Recruitment strategy not detailed	Yes	Unclear Not discussed	Unclear Not discussed	Yes Thematic analysis, influenced by grounded theory	Yes	Yes Local data but with national potential

Abbreviations: CYP, Children & Young People; ID, Intellectual Disability; PA, Physical Activity; PAR, Participatory Action Research; AAC, Augmentative & Alternative Communication.

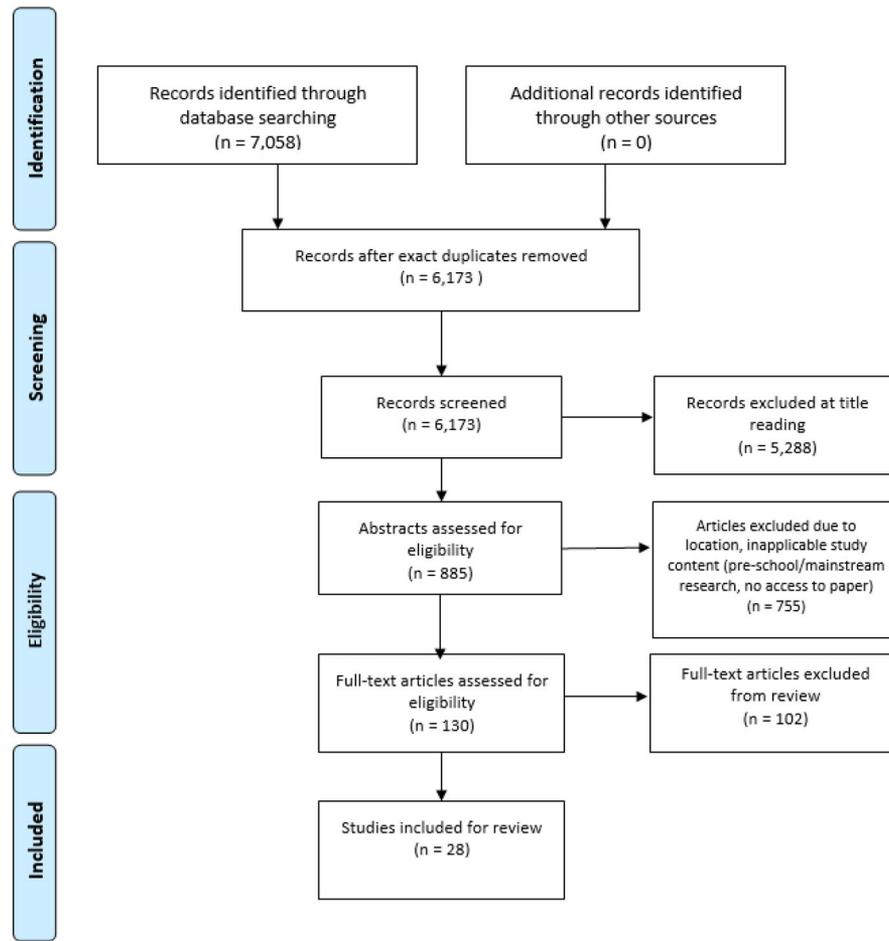


Figure 1: PRISMA flow diagram

Goff, 2019; Loyd, 2015; Maher and Fitzgerald, 2020; Pierce and Maher, 2020; Rees, et al., 2017). Four studies failed to address researcher-participant relationship or contingency planning to reduce researcher influence (Downs, Knowles, Fairclough, et al., 2014; Pierce and Maher, 2020; Rees, et al., 2017; Young, et al., 2016). A clear statement of study aims was not discerned in the report by Maher and Fitzgerald (2020).

Outcomes of intervention studies

The intervention studies reported overall positive results, with improved outcomes for children. Several were aimed at improvement of child behaviour or engagement in tasks, and others included language interventions.

Behaviour and engagement. Three studies detailed vision interventions (Black, et al., 2019; McKerr, et al., 2020; Pilling and Little, 2020). Black, et al. (2019) investigated the effects of in-school eyecare for children attending a specialist setting. Significantly more visual needs were met at follow-up than at baseline. The most common reason for some needs remaining unmet was non-compliance with wearing spectacles. For participants whose parents or teachers had been given advice to alleviate the unmet need identified at baseline, an improvement in engagement

(lower instances of off-task behaviour) was displayed at follow-up. Though the primary aim was assessment of the effects of in-school eyecare, more focus was placed on observation of behaviour prior to intervention which was not reflected so fully in the reported results. Pilling and Little (2020) trialled the use of a colour tent to determine differences of visual behaviour in children with cerebral palsy. Seven of nine participants showed visual behaviour changes, and the data were insufficient to evidence increased responses from the intervention. In a similar study, McKerr, et al. (2020) investigated the use of glasses and larger print text on the classroom behaviour of children with intellectual disability. When children had access to spectacles (if needed) or larger print text, behaviour improved.

Hedgecock, et al. (2014) investigated the effects of a humanoid robot in classroom-based tasks for children with intellectual disability. Teachers reported that the robot could be used in the pursuit of varied learning objectives for the children, helping them to attain targets. Children were assessed against an engagement measure from the Special Schools and Academies Trust (, 2011), and ratings were significantly higher when working with the robot ($z = 2.023, P = 0.043$).

Table 5: Study characteristics

Author (year)	Study design	Sample	Main findings	Primary outcome measure/Objectives	Cohens d (Effect size)
van Herwegen <i>et al</i> (2019)	Cohort study	Between groups: professionals working with children with: ASC = 77; DS = 26; WS = 38 (n = 141)	Professionals recognised areas of difficulty for the children they worked with, but less phenotypical difficulties were often unrecognised. Discrepancies between the difficulties identified by professionals and the support needed.	How informed professionals were about ASD, DS, and WS and where they gained this knowledge from. Professionals' views of challenges encountered. Obtain their opinions about the SEND services and support received by children.	Insufficient data
Ruddick, Davies, et al. (2015)	Descriptive cross-sectional questionnaire	Teachers and primary carers of 943 children aged 4–19 in 16 special schools	5.3% of children showed clinically significant behaviour and 4.1% showed behaviour of management difficulty. Primary carers were more able than teachers to identify children with significant behavioural difficulties and further needs.	Frequency and management difficulty of self-injurious, aggressive, and destructive behaviour in children with severe intellectual disabilities attending special schools in one UK city. Differential identification of behaviour and service need by teachers and primary carers. Meeting of needs by contact with specialist services.	Age increases support needs $d = 0.17$ Increased frequency of behaviour necessitates behaviour intervention: Self-injury $d = 0.58$ Aggression $d = 0.97$ Destructive behaviour $d = 0.67$ <1 HFB increases contact with professional $d = 0.31$ Challenging behaviour increases contact with social worker $d = 0.3$ Reflective error with unmet need $d = 0.812^a$ $d = -1.282^b$
Black, McConnell, McKerr, et al. (2019)	School-based observational study of children with significant refractive error / accommodation deficit	Reduced contrast sensitivity 24; Reduced distance or near activity 17; Ocular pathology 18 Visual field deficit 4; Anomalous eye movement Ctrl 20; Visual processing deficit 43; 199 participants	While a significant number of visual needs were met at follow-up, visual field deficits remained unimproved. Non-compliance with spectacles is the most common reason for unmet needs of refractive error. Improvements in 'off-task' behaviour evident if parent/teachers had received advice to meet visual needs:	Effect of in-school eye care upon classroom engagement and behaviours. Baseline measures: classroom behaviours and visual health assessment. Follow-up measures: Classroom engagement, eye examination and parent/teacher feedback	

(Continued)

Table 5: (Continued)

Author (year)	Study design	Sample	Main findings	Primary outcome measure/Objectives	Cohens d (Effect size)
Norburn, et al. (2016)	Descriptive questionnaire	Staff working with children with PMLD, SLD, MLD, ASD (n = 72)	A range of AAC approaches were identified by staff. Confidence and understanding of the reasons for using identified AAC strategies is reported as one of the key barriers to implementing AAC effectively.	To collect information about the range of AAC used by school staff. Guide discussion about staff training needs. Develop more effective use of AAC that supports curriculum access and communication for pupils in the school.	No effect size to be calculated
Lambert-Lee, et al. (2015)	Repeated measures cross-sectional	Within group. Students with Autism (n = 53)	For 23 students a repeated Vineland Adaptive Behaviour Scales (VABS) assessment was available. Results revealed statistically significant improvements over time on all ABLLS domains and for all VABS scores.	Fifty-three students with autism were tested and then re-tested with the Assessment of Basic Language and Learning Skills (ABLLS-R).	VABS composite $d = 0.62$ Communication $d = 0.49$ daily living skills $d = 0.63$ socialisation $d = 0.88$ ABLLS* total score $d = 0.19$ ABLLS learning skills $d = 0.23$
Hedgecock, et al. (2014)	Multiple case studies with review of video-recordings	Within group (n = 6) pupils in a special school, working with a humanoid robot.	Ratings were significantly higher when working with the robot ($z = 2.023$, $P = 0.043$)	Measured engagement using the scale developed by the Special Schools and Academies Trust (2011)	Engagement after working with robot $d = 2.93$
Pilling and Little (2020)	Intervention feasibility study: serial observations in colour tent	Children with profound, multiple disabilities and poor visual awareness (n = 9)	All children except child 2 showed a change in visual behaviour on at least one occasion while in the colour tent. No significant increase in response from session 1 to session 4.	Change in visual behaviour during intervention, or immediately after this. Optimum time exposure for change in visual behaviour to be observed.	No effect size to be calculated
Place, et al. (2015)	Cross-sectional single test with multiple measures	100 children with ASC and no other physical conditions	Wide variation in fitness levels (Eurofit test). Cardio-pulmonary fitness (VO ₂ max) is generally poor. BMI modest correlation with VO ₂ max for boys. No significant difference in girls.	Optimal number of sessions required for change in visual behaviour to be observed VO ₂ max + Bleep test, 10 × 5m run, broad jumps, sit-ups, flex test.	No effect size to be calculated
		Within group			Auxiliary and copula

(Continued)

Table 5: (Continued)

Author (year)	Study design	Sample	Main findings	Primary outcome measure/Objectives	Cohens d (Effect size)
Tobin and Ebbels (2019)	Single group repeated measures intervention study	(n = 11) Children with moderate learning disability and complex needs	Significantly more progress during the intervention period than at baseline	To evaluate the effectiveness of a school-based intervention using visual strategies to improve accurate use of auxiliary and copula marking in singular and plural, past and present tense by students with moderate learning disability and complex needs.	Combined $d = 1.08^d$ Copula $d = 0.06^c$ $d = 1.00^d$ Auxiliary $d = 0.41^c$ $d = 1.10^d$
Rees, et al. (2017)	Mixed methods Framework evaluation: audit semi-structured interviews and questionnaire	Within group (n = 6)	Evidence of positive influence on teacher mindsets, practice and ability to set appropriate targets. Increased staff collaboration and liaison with parents.	Objective was to evaluate the framework	Approaches to teaching and learning $d = -1.23^e$ Assessment, monitoring and target setting $d = -1.86^e$ Health, well-being, assessing and addressing challenging behaviour $d = -1.20^e$
Gutman, et al. (2018)	Longitudinal descriptive single group	Boys = 23, girls = 13. 6–11 yrs. Vulnerable severely traumatised children Stelmaszczyk (2018)	Significant improvement in socio-emotional, behavioural and academic development. Mixed for children's attachment representations. Narrative evaluation of own school initiative	Socio-emotional, behavioural and academic development. Attachment representations. Not applicable	Factors that support development $d = 0.99^e$ Factors that limit development $d = 0.49^e$ Whole school curriculum with application of the assessment model showed efficacy in short-term and long-term targets incorporated in EHCPs
The development of a holistic framework with whole-school, whole-curriculum approach	No effect size to be calculated				
Ebbels, et al. (2017)	Pre-test post-test intervention study	Intervention (n = 72)	Significant improvements were made post-therapy.	Expressive and receptive language improvement	Reported in main findings

(Continued)

Table 5: (Continued)

Author (year)	Study design	Sample	Main findings	Primary outcome measure/Objectives	Cohens d (Effect size)
Herring, et al. (2019)	1:1 SLT with control group Single case study pre-test post-test	students aged 9–17, 88% with receptive language impairment Intervention (n = 8) Special school students 7–19 years	Targets $d = 1.33$; Controls ($d = 0.36$); large clinically significant effect size ($d = 1.06$). Verbal students improved in initial sound fluency, nonsense word reading, and word recognition. No improvements in phonemic segmentation, when accessing the original or adapted intervention	To investigate effectiveness of the reading intervention Headsprout in children and young people with ID, specifically phonemic awareness and phonics skills. To investigate whether adaptations to its implementation impacted its effectiveness.	No effect size to be calculated
Castro, Grande, and Palikara (2019)	Documentary evaluation	Not applicable 236 EHCPs: 69 girls 167 boys, 4–21 yrs	Outcomes for EHCPs generally poor, differing across provision and type of outcome. Provision for children may not meet national/international standards.	Aimed to evaluate the outcomes defined for children with EHCPs in England	No effect size to be calculated
McKerr, et al. (2020)	Case studies of behaviour following vision intervention	Case studies (n = 9) children 4–11 yrs with ID and unmet visual need	When CYP with ID were given access to glasses or larger print their behaviour improved.	Behaviour improvement after provision of glasses or larger print.	No effect size to be calculated
Pearlman and Michaels (2019)	Structured AAC-assisted interviews	(n = 22) 12 females, 10 males 6–14 yrs with moderate, severe or PMLD	AAC alongside conventional methods allows children with PMLD to express thoughts about school and home life. Discrepancies seen between ratings from parents and NHS professionals. Video recordings are advised for CYP with PMLD for occasions such as the EHCP review, as is gathering information from various key people in the child's environment.	How children with PMLD could contribute to their EHCP reviews using AAC and make their preferences and views known. To assess the way that the key adults around the children interpreted their communication and whether relationship affects this interpretation	Teacher to parent rating $d = -0.72$ Teacher to NHS staff rating $d = -0.63$
Goodwin, et al. (2019)	Qualitative Focus groups	(n = 40–45) 5 focus group around the UK, each with 8–9 participants	When standing frames are used in educational settings multidisciplinary and interagency communication and staff training are vital.	Gathering the opinions of professionals' and parents' experiences and views of standing frame use specifically in educational settings.	No effect size to be calculated

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Table 5: (Continued)

Author (year)	Study design	Sample	Main findings	Primary outcome measure/Objectives	Cohens d (Effect size)
	Part of larger mixed methods study			Support design of future intervention study.	
Downs, et al. (2014)	Qualitative exploratory with semi-structured interviews	n = 23, (9 male, 14 female), teachers & teaching assistants, 3 SEN primary or secondary schools in NW England	Participants were aware of the influence they had on children's physical activity involvement but also suggested that parents may have more. Children with ID lacked understanding of the importance of physical activity and its health benefits.	Explore teachers' perceptions of barriers and facilitators to physical activity for children with ID	No effect size to be calculated
Pierce and Maher (2020)	Qualitative Semi-structured interviews	2 PE teachers and 2 learning support assistants in special schools	Schools for CYP with ID need extended space for PA. Personal, individualised PA would be better tailored to each CYP as this may be a more efficient use of space.	Provide an insight into the physical activity tendencies of children and young people (CYP) with intellectual disabilities.	No effect size to be calculated
Maier and Fitzgerald (2020)	Qualitative Semi-structured interviews	18 SEN PE teachers, learning support assistants, & senior leaders	Special schools were more fluid in what they defined as PE than mainstream schools, with a desire to embrace cross-curricular possibilities.	Analyse the nature, purpose and value of special school physical education	No effect size to be calculated
Franklin and Goff (2019)	Ethnographic observation, interview & document analysis	10 sites with extended involvement. No record of number of participants.	Reported positive aspects of practice to further inform the first international monitoring system to prevent abuse of disabled children in residential settings.	International monitoring for the prevention of abuse in disability. Develop a methodology for inspections in residential settings for disabled children.	No effect size to be calculated
Loyd (2015)	Qualitative Multimodal interviews	10 pupils (six female, 4 male) with autism, one school, 16–18 yrs, attending drama classes.	Pupils were able to identify aspects of drama education that they liked and did not like; share goals of drama education and communicate feelings about drama education.	Assess proactive communication efforts. Larger study aim: Identify outcomes for the pupils from participation in drama education and to examine relevant teaching approaches that facilitated these outcomes.	No effect size to be calculated
Davis, et al. (2018)	Participatory action research. Survey and	33 day and resident students (15 male, 18 female) 5–26 yrs	Proactive approach by school nurses to raise awareness and understanding through questioning was positively received.	To consider alternative approaches to providing health promotion opportunities and experiences that	No effect size to be calculated

(Continued)

Table 5: (Continued)

Author (year)	Study design	Sample	Main findings	Primary outcome measure/Objectives	Cohens d (Effect size)
Greathead, et al. (2016)	documentary analysis Case studies: Ethnographic and structured observation	2 girls (11 & 13), 1 boy (8 yrs) complex communication needs & SLD	Reinforced how meaningful and relevant information could be delivered. Each child had clear methods of communication, and staff understood the majority of their bids for interaction, some of which idiosyncratic and might otherwise be overlooked.	enhance the overall health and well-being of children & young people with complex neurodisabilities. To assess communication with children with PMLD	No effect size to be calculated
Crombie, et al. (2014)	Qualitative case study	Whole school professional practice. Otherwise not reported.	Ability to empathise and form excellent relationships with the pupils was central to staff professional practice. Values, support, explicit processes, and reflection were vital factors. Some elements of professional practice were learnt experientially (not through training).	To identify professional practice across the school that is implicit and may not be recorded by Ofsted and other government bodies	No effect size to be calculated
Gaona, et al., (2020)	Qualitative Documentary review of EHCP	Young people with ASD. n = 12, 16–19 yrs, (10 male, 2 female)	Discrepancies were found between plans in the ways in which the voices of young people with ASD were elicited in developing EHCPs. Key areas of functioning were identified that make up the views, wishes and aspirations of the pupils.	Aim: to explore how the views, wishes and aspirations of young people with ASD in transition to post-16 education and employment were depicted in their EHC plans, and whether plans match their aspirations.	No effect size to be calculated
Young, et al. (2016)	Mixed methods GAS-ID, WASI, and interviews in special schools	Interviews with 25 adolescents with ID (10 women 15 men) and 27 without ID (16 women 11 men) 15–18 yrs,	Adolescents with IDs expressed more general worries about failure and personal threat. Level of distress about worries was positively correlated with anxiety in both groups. The adolescents with IDs were significantly more anxious than their non-disabled peers.	Aimed to explore the content of the worry of adolescents with IDs and their non-intellectually disabled peers and possibly identify differences between the groups.	Participants with ID had higher anxiety levels $d = 0.56$

Abbreviations: HFB, High functioning behaviour; CYP, children and young people; ID, Intellectual disability; PMLD, Profound and multiple learning disabilities; DS, Down syndrome; WS, Williams syndrome.
^aBaseline. ^bFollow up. ^cChange at baseline. ^dChange with intervention. ^eWithin-group effect.

Ruddick, et al. (2015) explored the support needs of children with self-injurious, aggressive and destructive behaviour. Ratings by family and teaching staff of such behaviour were compared, and access to the services was investigated. Teachers and family primary caregivers of children with severe intellectual disability attending special schools in one UK city completed questionnaires. Primary caregivers identified more behaviour of interest than did teaching staff. The need for intervention for children displaying high levels of the indicated aspects of behaviour was 13 times greater than in the other children. Despite this, the number of children displaying the behaviour and receiving contact from a healthcare professional was only double the number of the remainder.

Another study detailed the delivery of an Applied Behaviour Analysis (ABA) education model in a special school in London, UK (Lambert-Lee, et al., 2015). During this study, 53 students with autism diagnoses were assessed against the Assessment of Basic Language and Learning Skills (ABLLS-R) and the Vineland Adaptive Behaviour Scales (VABS). Following introduction of the model, significant improvements were seen in all aspects of the assessment criteria, evidencing improved child behaviour.

Young, et al. (2016) used mixed methods to investigate the content and emotional effects of worries experienced by adolescents approaching transition from school. Participants were students with intellectual disability ($n = 25$), and a comparison group without ($n = 27$). Two measures of worry were administered: the Glasgow Anxiety Scale for People with an Intellectual Disability (GAS-ID) (Mindham and Espie, 2003), and the Wechsler Abbreviated Scale of Intelligence (WASI) (Wechsler, 2011). Common worries were expressed about death, failure, decisions, school, relationships, family, bullying, work, further education, health, friendship, money, loneliness, home and appearance. The study group worried more about death, bullying, relationships and decision-making, while the comparison group worried more about failure, money, family, and college.

Language and communication. Herring, et al., (2019) investigated the effects of an adapted Headsprout reading intervention on phonics and phoneme awareness and skills for children in special schools. Both non-verbal and verbal children with diagnoses of severe learning difficulty, autistic spectrum conditions (ASC) or both were represented. Two pupils had other needs detailed as expressive/receptive language problems and hydrocephalus. Improvements were noted in reading fluency and word recognition in verbal students.

Ebbels, et al. (2017) investigated the effects of 1:1 speech and language therapy interventions for children with developmental language disorder, focusing only on specific targets. Other areas of language acted as control

variables. Despite improvement in all areas, significantly more improvement was seen in the targeted areas of language than in control variables ($d = 1.06$). Tobin and Ebbels (2019) assessed the specific area of auxiliary and copula marking in each tense at baseline and following a language intervention using visual strategies with children with moderate learning disability and complex needs. Significant improvement was seen during the intervention period when compared to the baseline achievement (Combined $d = 1.08$, Copula $d = 1.00$, Auxiliary $d = 1.10$).

Pearlman and Michaels (2019) assessed how children with profound and multiple learning disabilities (PMLD) used augmentative and alternative communication (AAC) to express their views during the EHCP review process, and how key adults in the children's lives interpreted the children's communication. Although use of AAC allowed children to communicate their views more successfully, there were discrepancies in the way that parents, teachers, and NHS staff interpreted the child's communications. Norburn, Levin, Morgan, et al. (2016) assessed the use of a range of AAC methods by staff in a special school. Lack of confidence in utilising the different methods and reasoning for each was highlighted as a barrier to efficacious use. Self-reported staff training for each method varied. It was useful to highlight problematic aspects of practice, but outcomes were not identified.

Professional views and health outcomes. Through questionnaires, Van Herwegen, et al. (2019) detailed the views of professionals regarding their knowledge of Down syndrome, ASC and Williams syndrome. The questions focused on the challenges faced when working with children with these diagnoses, and how professionals perceived the SEND services and support received by the children. The participants often failed to recognise less common difficulties associated with the conditions. Disparities were also seen between the difficulties identified by professionals and the support that they deemed necessary. The research was limited by the available responses to the questionnaire, which was also not validated beforehand.

A single study (Place et al., 2015) investigated the physical health of 100 children with autism (79 boys) through physical fitness testing. Using Eurofit measures, the researchers identified large variation in fitness levels. The children also showed generally poor levels of cardio-pulmonary fitness.

Framework efficacy. The remaining studies all detailed development or efficacy of specific frameworks. Gutman, et al. (2018) evaluated the framework of a residential, therapeutic, specialist school. In a longitudinal study, the researchers reviewed the progress of four cohorts of children over 3 years. Improvement was shown in teacher practice, mindset and target-setting ability, and the framework was well-received by parents. The children all

showed improvements in academic, behavioural, and socio-emotional development. Despite more sporadic results when assessing children's attachment representations, the researchers cite the often traumatic life experiences of the vulnerable children attending the school as the possible explanation for this.

Stelmaszczyk (2018) reported the development of an assessment framework for a new *curriculum* model: 'Can Grow', designed to assess both short- and long-term outcomes in children's EHCPs, both academic and otherwise. In this narrative case study, 'The Woodlands assessment model' was discussed, and results infer that the model was easy for teachers to use and that the school was succeeding in delivering a holistic curriculum to its students. Impact was not assessed.

Castro, et al., (2019) evaluated the outcomes from 236 children's EHCPs to assess the quality of the intended outcomes. A total of 2813 outcomes were assessed, most of which were not functional or of high quality. Disparities in quality were seen between different local authorities, between schools and between children with different types of need.

Rees, et al. (2017) evaluated the South Lanarkshire framework for children with severe and profound learning needs through audit of curricular practice, questionnaires and interviews. Quantitative findings showed large effect sizes for varied outcomes (Approaches to teaching and learning $d = -1.23$; Assessment, monitoring and target-setting $d = -1.86$; Health and well-being, and assessing and addressing challenging behaviour $d = -1.20$). The framework increased collaboration between staff and was received positively by parents. It influenced teachers' ability to set targets and improved their mindset and practice. Further work is required to establish the impact of these improvements in process.

Qualitative studies

The qualitative studies explored a variety of topics including standing frame use (Goodwin, Lecouturier, Smith, et al., 2019), development of residential school inspection (Franklin and Goff, 2019), children's opinions of drama lessons (Loyd, 2015), health promotion (Davis, et al., 2018), communication (Greathead, Yates, Hill, et al., 2016), implicit professional practice (Crombie, Sullivan, Walker, et al., 2014) and how post-16 individuals with autism had their views and aspirations expressed during the EHCP process (Gaona, et al., 2020). Three studies explored physical activity in disabled children (Downs, et al., 2014; Maher and Fitzgerald, 2020; Pierce and Maher, 2020).

Personal and physical factors. Goodwin, et al. (2019) conducted five homogenous or mixed focus groups to explore views and experiences of children with cerebral palsy using standing frames in schools. These included

paediatricians, physiotherapists, orthopaedic surgeons, occupational therapists, teachers and parents. Thematic analysis derived four subordinate themes: young people's autonomy, balancing education and therapy, competence and confidence, and working within logistical boundaries. Issues of staffing, space, time, differentiated activities and confidence in operation were barriers to standing frame use in schools. Some children improved their engagement and peer interaction while using a frame, but others became more segregated. Training and confidence were required to adapt an individualised approach to each child for them to benefit from use of the frame.

Ten pupils with autism from a specialist further education unit were interviewed by Loyd (2015) regarding participation in drama lessons. The young people were observed for a period of 34 weeks, interviews taking place in week 17, allowing time to build researcher-participant rapport and to establish participants' methods of communication. The purpose of the second 17 weeks was not explained. Likes and dislikes in drama, school in general and feelings about performance were elicited using a sentence completion activity. Five further questions related to photographs of participants in their drama lesson. Then, a video of the young person in performance was discussed, followed by two theory of mind tests. The pupils enjoyed drama. All were able to define goals and activities in drama, as well as communicating their feelings about drama.

In an action research study of a school nurse team's approaches to providing health promotion for disabled young people, Davis, et al. (2018) collected data from school records, discussion notes from working group meetings and group feedback about access to current school health information. There was also a bespoke staff questionnaire for teachers. The working group utilised www.e-bug.eu, a website of health information and resources for education. Staff feedback was positive overall. Staff became more aware of ways to promote health to pupils positively, and a more integrated working approach was adopted. Further validation of the approach was needed, and a more general measure for use prior to the provision of the health promotion scheme would be of benefit.

In an ethnographic study, Greathead, et al. (2016) explored how three young people with severe-to-profound learning difficulties communicated, and how they were supported by adults. A researcher spent 'a day in the life' of each of the young people, from their morning routine to their return to residential care into the evening, taking field notes of observations and engaging in informal discussions with staff. Structured observations were completed for 60-second periods of specific activities throughout the day. Both child- and adult-initiated communications were coded, together with whether or not these communicative bids were successful and led to an

exchange. The Social Communication Emotional Regulation and Transactional Support (SCERTS) checklist (Prizant, Wetherby, Rubin, et al., 2006) was applied after the participant completed activities. The participants each had personal methods of communication, and the staff working with them had a comprehensive understanding of their methods and most of their communication bids. Participants' communicative bids differed according to context. Certain activities brought more joy, for instance, so more bids for communication were made. Similarly, levels of communication differed with more physical needs, as distal communicators might be missed by supporting adults.

Downs, et al. (2014) explored teacher perceptions of facilitators and barriers to physical activity (PA) for children with disability. Three video-recorded, semi-structured focus groups included 23 specialist school staff (teaching assistants, PE teachers, sports specialists and class teachers), all with experience in teaching children with intellectual disability. Data were analysed inductively and deductively, and transformed into pen profiles. Access to PA, fitness components of PA and environmental factors were the main themes. Participants acknowledged their role in child engagement, but suggested that the greatest influence on this was from parents. They suggested that children enjoy more unstructured physical activities that allow them a sense of independence and the opportunity to make progress with skills.

In a similar study, Pierce and Maher (2020) interviewed two PE teachers and two learning support assistants, to explore PA for children with intellectual disability. Data from the semi-structured interviews were analysed thematically. Indoor space was found often to be a barrier to PA, and an individualised approach improved engagement as children made their own choices about PA and engaged in self-regulation during the activity. Lack of specialist equipment (in the absence of storage space) was also seen as a barrier to engagement.

Investigating the culture of PA in special schools through semi-structured interviews with 18 staff members, Maher and Fitzgerald (2020) identified as key factors the broad, balanced curriculum; a needs-based approach; cross-curricular approaches to PA; and PA as a preparation for life outside school. The special schools tailored PA to the children's needs and preferences, providing enjoyable learning experiences. Boundaries between subject areas were also more fluid, so PA could be incorporated into other lessons at times. PE lessons were also seen as opportunities to teach basic life skills and to prepare children for life outside school. The impact was not assessed.

Professional practice. Franklin and Goff (2019) reported the UK arm of a European study to inform inspection of residential children's care for children with complex needs and communication difficulties. The study included

observation of the culture of the care setting, interviews with staff members and young people, and reviews of documentation and reporting procedures. Thirty-one trained 'monitors' who already worked with children with disabilities completed full-day visits to the care homes. Only positive aspects of practice were reported, although the researchers highlighted that there were various concerns, from isolation of some children to gaps in supportive services. The identified practices were individualised approaches to communication, the use of technology to facilitate communication, a respectful culture of communication, involvement of staff in decision-making at all levels, recognition of behaviour as a form of communication and facilitating communication with parents.

In a specialist school, Crombie, et al. (2014) investigated implicit practice that might not be examined by Ofsted. A five-stage case study approach was adopted: identification of professional values, observations of professional practice by the project educational psychologist, staff 'observation' of their own practice, parents' observations and views and staff consultation. Parents reported that the school's approach to education and care was excellent. A focus on staff-pupil relationships was key to positive outcomes for the children. Elements of practice that were learnt experientially rather than during staff training sessions were recognised. This required staff members to feel supported by senior staff, values or principles to be developed as a shared process, rigorous adherence to frameworks and opportunity for staff to reflect.

By assessing sections A and F-H of EHCPs, Gaona, Castro, and Palikara (2020) explored the views and aspirations of 12 young people with autism and whether these were matched to the provision received. The length of section A (views of the young people and their family) varied from 2 to 9 pages of information between plans, questioning the effectiveness of young people's participation in the EHCP. Information was coded against the International Classification of Functioning, Health and Disability for Children and Young people (ICF-CY). Data that failed to fit with the ICF-CY were marked as 'not definable'. Educational provision was most prominent in content across all 12 plans, with less focus upon health and social care provision. Not all plans evidenced the authentic voice of the young people, and on multiple occasions, their views were entirely assumed. Provision requirements were sometimes based on the desired outcome for the young person, but others were decided solely on their needs.

Discussion

The evidence related both to interventions directly for disabled children and young people and to frameworks to enhance their education and care provision. There was rigorous evidence utilising mixed methods (Rees, et al., 2017; Young, et al., 2016). The study by Rees

et al provided the strongest evidence of efficacy of frameworks, with large effect sizes from empirical data, illuminated by qualitative evidence. While specific to Scotland, the positive results are given to wider application in the UK. Similarly, the longitudinal approach of Gutman, et al. (2018) offered robust evidence of the effects and outcomes for children, though the source of research funding introduced potential bias. Evidence was provided regarding ineffective outcomes that may often be listed in a child's EHCP (Castro, et al., 2019). Similarly, Gaona, et al., (2020) highlighted discrepancies in the means of eliciting young people's views during the EHCP process. Although there is a need for additional and more extensive research, the indicators of the need for change were strong.

For those investigating professional views and approaches, Van Herwegen, et al's (2019) study provided a sound evidence base, identifying the need for more robust methods of data collection from professionals. Franklin and Goff's (2019) high-quality evidence should inform selection or development of comprehensive inspection methods for care home efficacy in the care of children with complex needs and communication difficulties.

There was reasonable evidence that creative approaches to PA for disabled children are required, and that lack of storage space often hindered optimal provision (Downs, et al., 2014; Pierce and Maher, 2020). The research also suggested that parents had the most influential role in the amount of PA taken up by children (Downs, et al., 2014). Maher and Fitzgerald (2020) highlighted the need for individualised approaches to PA as well as utilising the time during PA to teach life skills. There were no disparities in the quality of these studies. Empirical evidence was available of poor levels of fitness in children with autism (Place, et al., 2015). A distinct lack of positive outcomes for young people was evident in these studies. New knowledge for the field was highlighted, but impact could not be stated.

Convincing evidence was available regarding behaviour and engagement; Black, et al. (2019) offered the most robust evidence with a large sample. Further research was needed to review the equivocal results in Pilling and Little's (2020) study investigating the use of a colour tent for children with cerebral palsy. There were useful clues from Loyd's (2015) investigation of young people's views of participation in drama lessons, but details of the second part of the study required clarification. The improved behaviour and engagement reported in these studies imply better outcomes in the lives of the young people involved, though this was not evidenced directly. It could be inferred that reduction in stimulation, more engagement and improved behaviour brought about by ABA (Lambert-Lee, et al., 2015) could create positive social and academic outcomes. Such impact was

identified regarding some of the visual interventions (Black, et al., 2019; McKerr, et al., 2020). While Rud-dick, et al. (2015) identified unmet needs for children with aggressive or self-injurious behaviour, no focus was placed on the resulting outcome. Similarly, Young, et al. (2016) understood the worries and fears of children and young people during school transition, but could not pursue this into reported outcomes.

Language and communication interventions produced positive outcomes in some areas and for some students (Herring, et al., 2019), as did one-to-one speech and language therapy sessions for specific targets (Ebbels, et al., 2017; Tobin and Ebbels, 2019). Evidence for AAC use produced ambivalent outcomes with evident discrepancies between the outcome for children utilising AAC and the views of the adults around them regarding its use (Norburn, et al., 2016; Pearlman and Michaels, 2019).

The overall quality of the research was at least adequate. For all studies, both empirical and qualitative, in which disabled children and young people were active participants, relevant adaptations were made to enable all young people to participate fully. The fit of research with the social model of disability (Oliver, 2013) was clear. Intervention studies all evidenced their effect upon a positive outcome for disabled children, along with evidencing the connection between behaviour and physical or emotional aspects. Vision interventions provided evidence of improved behaviour because of improved visual care and provision. Interventions for both communication and engagement were successful, as was the use of frameworks in a rigorous manner. Review of the qualitative studies indicated that professionals working with children and young people with special educational needs and disability were empathic to the needs of the pupils. There was a general understanding in special education that the approach should be individualised and that staff experiences are central to best practice in addition to formal training. The evidence was clear that frameworks have positive effects when implemented and adhered to by all professionals involved. Cohesion of professionals involved with the EHCP process also appeared to be imperative.

Limitations

This review was selective in its reporting as only UK studies and practice were considered. This is not to refute global research, but rather an acknowledgement that central governance processes and national education policy exert powerful influence on education and care practices for children with special educational needs and disability. While recognising the importance of international comparison and consequent learning, the complexity of the review of evidence solely from the UK, together with the need to underpin an associated research study, meant that this limitation was necessary.

Conclusion

This review addressed practice and approaches to the education and care of children and young people with special educational needs and disability. Other than efforts to enhance engagement and to personalise interventions, there was little focus in the literature on the specific attributes of expert practice together with the outcomes that result from this. The focus, as noted in previous reviews and discussions, was largely on the processes of education within institutions rather than on individuals' practice. Although evidence on implicit practice exists (Crombie, et al., 2014), there is a need to address the ways in which these implicit practices are applied while adhering to both internal and external guidelines within special schools. Important gaps remain in identifying the complex aspects of expert practice in the education and care of this population in the UK.

A range of interventions was efficacious and could be utilised to improve outcomes for children and young people with special educational needs and disability. Views of professionals working with these children suggest that communication between all parties is key, that there should be a focus on relationships between staff and pupils or supported young people, that an individualistic approach is necessary for each child and that support from the educational or care institution benefits professional practice and reflection.

There was also convincing evidence that the EHCP process should be reviewed in terms of disparity in outcomes, the need for improvement in formulating desired outcomes for children and young people, and addressing the authentic voice of young people. Similarly, further research should work towards a collective framework of approaches and guides for AAC.

There was limited evidence that drama lessons were enjoyed and valued, though outcomes remained unclear, while outcomes on the use of standing frames were equivocal. The evidence was weak or flawed in the remaining areas, and significant gaps remain in understanding the outcomes and impact of these interventions.

Conflict of interest

The authors have no conflict of interest to declare.

Data availability statement

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

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