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EDUCATION POLICY | REVIEW ARTICLE

A review of interventions for children and youth with severe disabilities in inclusive education

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Abstract: Children with severe disabilities are often excluded from educational opportunities due to inter alia attitudinal barriers and a lack of teacher training. This scoping review paper assessed intervention studies focused on inclusive education for children with severe disabilities. It was found that a total of 13 studies met the review's inclusion criteria. The results revealed a paucity of literature and highlighted five main areas of focus in the available intervention studies. The majority of intervention studies were found to be focused on increasing engagement, reducing behaviours and improving social inclusion as



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PUBLIC INTEREST STATEMENT

All children have a right to be included in educational settings alongside their peers. This is in line with an equitable and inclusive society, regardless of differences in intellectual and communicative abilities. However, children with severe disabilities are often at risk of being excluded in social and educational activities. Addressing their inclusion in the educational context is crucial. The aim of this scoping review was to assess intervention studies focused on inclusive education for children and youths with severe disabilities. Findings highlighted that children with severe disabilities are seldom included in general education and there is limited research on inclusion in educational settings. This study provides important information for both practitioners and researchers, by examining emerging and available evidence, and identifying knowledge gaps necessary to stimulate further exploration in the field of inclusive education.

outcomes. There was limited focus on studies focusing on the improvement of academic outcomes.

Subjects: Allied Health; Health & Society; Health Conditions

Keywords: inclusion; severe disabilities; inclusive education; interventions

Children with severe disabilities are often excluded from educational opportunities. Severe disabilities are described as substantial or permanent intellectual disability combined with physical impairment (e.g., hemiplegia), sensory impairment (e.g., hearing loss or vision disturbances), and health conditions (e.g., epilepsy), which manifest during childhood (Brady et al., 2016; Goldbart et al., 2014; Sylvester et al., 2017; Wilder et al., 2015). Within the extant body of literature, the combination of intellectual disability and multiple associated impairments is referred to by different terminologies, for instance severe disabilities, profound intellectual and multiple disabilities, or complex communication needs (Axelsson et al., 2013; Lancioni et al., 2018; Raghavendra et al., 2012). Children with severe disabilities are a heterogeneous population. This means that each child will not only vary in the degree and type of disability but also in their individual strengths, limitations, needs, and priorities in education (Wilder et al., 2015). Despite the heterogeneity and use of varied terminology, what is common among children with severe disabilities is a significant delay in speech and language skills which affects their overall communication abilities (De Bortoli et al., 2014).

The Salamanca Statement and Framework for Action on Special needs Education (UNESCO, 1994) spurred an international agenda for inclusive education. The United Nations Convention on the Rights of Persons with Disabilities (UN Convention on the Rights of Persons with Disabilities UNCRPD, 2008) further galvanised inclusive education as a basic human right. This was specifically articulated through Article 24, which asserts the right of persons with disability not only to education but to an inclusive education system at all levels of learning (UNCRPD, 2008). Despite these transformative efforts, researchers agree that children and youth with severe disabilities have not fully realised their right to inclusive education (Ainscow et al., 2019; Graham et al., 2020). A variety of reasons are attributed to exclusion of children with severe disabilities from educational opportunities, including attitudinal barriers and a lack of teacher training on student inclusion and participation. All of these factors result in children with severe disabilities experiencing poorer outcomes in respect of their education and general well-being (European Agency for Special Needs and Inclusive Education, 2018; United Nations, 2018). It is therefore important to address and reduce these children's inequitable access to participation in education.

Concerning education for students with disabilities, inclusive settings are characterised by accommodating students' social and academic needs, as well as by promoting acceptance for diversity in school communities. As such, inclusive education entails aspects of both educational and social inclusion. Whereas educational research about students with severe disabilities is scarce, there is some evidence of research on inclusive education of students with intellectual disability. Studies show that students with intellectual disability perform academically as well or better in mainstream settings than in segregated settings (De Graaf et al., 2013; Dessementet et al., 2012). On the other hand, social inclusion appears to constitute a challenge, as the children with intellectual disability experience fewer positive peer relationships and more stigma in mainstream settings (Hardiman et al., 2009; Szumski & Karwowski, 2014).

Furthermore, research also indicates that including children with intellectual disability in mainstream schools does not have a negative impact on their classmates' performance (Szumski et al., 2017) and is in fact positively related to the social acceptance in their classrooms. At the same time, researchers call for a more distinct description of the type of support that exists for students with intellectual disability in mainstream settings (Dessementet et al., 2012). A systematic review about inclusive education research and practice, published between 2002 and 2016, shows that

research mostly focused on theory and descriptive aspects of inclusion rather than on aspects of the practice of inclusive education (Amor et al., 2019).

A review of interventions in inclusive settings for secondary students with intellectual disabilities (Kuntz & Carter, 2019) revealed 40 intervention studies that focused on five types of interventions: systematic instruction; self-management strategies; peer-mediated communication interventions; peer support arrangements; and educational placement changes. The authors pointed to a limited range of intervention approaches and a lack of attention to student academic outcomes, and they subsequently called for more research on interventions in general education settings. An earlier review by Hudson et al. (2013) focused more specifically on instruction for students with moderate and severe intellectual disability to enhance their academic learning in general education settings. The authors located 17 studies and concluded that instruction using delayed feedback constitutes an evidence-based strategy. Hudson et al. (2013) also called for more research in the field and pointed out that the characteristics of general education settings may require other types of intervention than the self-contained ones.

1. Inclusive education for students with severe disabilities

Interventions for students with severe disabilities in inclusive education contexts (i.e., where children are not separated by personal characteristics) can address a range of outcomes. These outcomes might include academic learning outcomes (e.g., adaptive skills), social outcomes (e.g., activity participation), communication outcomes (e.g., peer interaction), and psychological outcomes (e.g., challenging behaviour).

We could find only two reviews specifically addressing inclusive education of children with severe and complex disabilities, namely those of Dell'anna et al. (2020) and Ballard and Dymond (2017). According to Dell'anna et al. (2020), the children placed in general education settings achieved better academic outcomes and adaptive skills and displayed fewer challenging behaviours. However, social exclusion was found to constitute a challenge as the children experienced marginalisation and isolation in peer groups in these settings. Ballard and Dymond (2017) reviewed studies dealing with stakeholders' beliefs about education for children with severe disabilities in general education settings. According to their review, the stakeholders appreciated individualised support in general classroom environments and valued social inclusion as the primary goal of education in general education classrooms. A review of policies for children with severe disabilities conducted by Colley (2020) pointed to a lack of attention to this group of children in debates on inclusion.

In education, communication and interaction abilities and opportunities are especially important for students with severe disabilities. A review of studies on interaction with children with profound multiple disabilities (Nijs & Maes, 2014) revealed a scarcity of intervention studies focusing on interaction between children with and without disabilities. Nijs and Maes (2014) could identify only eight studies, out of which only four focused on some form of intervention—for instance social skills training to peers, or assistive technology to support communication. The interventions that focus on peers have great potential, as a communication partner who can recognise a child's initiative on interaction can more easily support the child in interaction (Chung et al., 2012). For children with severe disabilities who use augmentative and alternative communication (AAC), peer interventions may require the consideration of several factors, including the individual child, their peers, and the context of the activity (Therrien et al., 2016). Interventions that focus on peer interactions have been effective in creating increased opportunities for interaction between children who use AAC and their peers (Therrien et al., 2016). Furthermore, a recent scoping review of AAC research conducted about children with severe disabilities who use AAC in inclusive settings found that the primary aim of overall studies was increasing the usage of AAC. Iacono et al. (2022) concluded that the aims of the research were not focused on AAC as a mediator for learning and the outcomes did not focus on academic learning.

The aim of the current study was to identify and systematically review intervention research on inclusive education for children and youths with severe disability in peer-reviewed articles written

in English. Reviews provide important information for both practitioners and researchers, and scoping reviews have a threefold use: to examine emerging and available evidence, to identify knowledge gaps, and to clarify key definitions in a research field (Munn et al., 2018). This scoping review may allow a better understanding of the evidence base with regard to how inclusive education is considered and provided for children and youths with severe disabilities. This scoping review can also give clarity on how researchers define inclusive education for this target group.

The sub-aims of the review included the following: (a) What characterises participants in existing research on inclusive education for children with severe disability (e.g., age, specific diagnosis, severity of disability, comorbidity)? (b) In which types of setting are the studies performed? (c) How is inclusive education defined? (d) What are the purposes and core results of the research? (e) What types of outcomes (dependent) variable are focused on and how are they measured (behavioural categories, study design, instrument used, etc.)?

2. Method

2.1. Design

A scoping review was selected to provide a generalised overview of the studies that have been conducted in inclusive education for children with severe disabilities. The authors used a scoping review methodological framework as recommended by Arksey and O'Malley (2005). According to the scoping review methodology, a formal assessment of the study quality is not required, and therefore it was not conducted (Sucharew & Macaluso, 2019; Tricco et al., 2018).

2.2. Search strategy

As recommended for systematic reviews, an electronic search was conducted in the following four search databases: Education Resources Information Center (ERIC), PsychINFO, PubMed, and SCOPUS. These databases were selected owing to their inclusion of education literature. The search terms were aligned with the aims of the scoping review and followed the Population, Intervention, Comparison, Outcomes and Study Design (PICOS) format (Aromataris & Munn, 2020). The databases were initially searched in April 2020, and the search was updated in March 2021.

A multifaceted search strategy was employed to prevent a biased yield and to identify additional studies of relevance (Schlosser et al., 2007). Studies that met the inclusion criteria were identified through a combination of three search methods: (a) an electronic database search for peer-reviewed studies; (b) a forward citation conducted from references of included articles via Google Scholar, and (c) ancestry searches using the reference lists of included articles.

The electronic database searches were restricted to temporal (2001–2020), linguistic (English) and source-type (peer-reviewed academic journals) limiters. Via an emailed Research Information Systems (RIS) link, electronic studies were exported to Covidence, a web-based software application tool, to enable streamlined production of the study screening process (Veritas Health Innovation, 2018).

The searches in the databases were performed through various combinations of keywords and mesh/thesaurus terms. The search strategy employed Boolean operators (i.e., AND, OR) and truncated keywords related to severe disability, inclusive education, and setting. The search terms were relevant to the broad research question examined by this review, and they were selected based on consultations with subject librarians. Pilot searches conducted in the various databases are outlined in Table 1. The four databases were independently accessed and searched, using the same search terms but different strategies, given the unique structure of each database. The studies retrieved were imported into the Covidence programme where the authors coded them as “included” or “excluded with reason”.

2.3. Selection of studies

The search identified 1413 relevant articles. Articles were screened against the inclusion and exclusion criteria (Table 2), first at title and abstract level, and then at full-text level, following

Table 1. Search term, strategies, and yields for electronic databases

Database	Search strategy	Total minus duplicates
PubMed	syndrom* OR impairment OR disab* OR “brain injury” OR “cerebral palsy” OR “learning disabilities” OR “learning disability” OR “developmental disability” OR “developmental disabilities” OR “mental retardation” OR intellectual disab* disab* OR severe disab* OR significant disab* multiple disab*AND	36
SCOPUS	syndrom* OR impairment OR disab* OR “brain injury” OR “cerebral palsy” OR “learning disabilities” OR “learning disability” OR “developmental disability” OR “developmental disabilities” OR “mental retardation” OR intellectual disab*disab* severe disab*significant disab*multiple disab* AND Inclusive education OR Inclusion OR Inclusive practice OR Inclusive instruction OR Pulled out OR Pull out OR The least restrictive environment OR Integration OR Special classroom OR Resource classroom AND Upper secondary school OR Secondary school OR Primary school OR Elementary school OR School OR Preschool OR Kindergarten OR Nursery	39
ERIC	Special Education OR Special Education Students OR Special Needs OR Brain Injuries OR Developmental Disabilities AND Inclusive education OR Inclusion OR Inclusive practice OR Inclusive instruction OR	659
PsychINFO	Special Education OR Special Education Students OR Special Needs OR Brain Injuries OR Developmental Disabilities AND Inclusive education OR Inclusion OR Inclusive practice OR Inclusive instruction	679

the PRISMA Scoping Review structure (Tricco et al., 2018). All screenings were conducted by two reviewers who independently used Covidence. Disagreements were discussed until resolved. The study selection process is described in the PRISMA flow chart presented in Figure 1 and described in detail in the results section.

The review included original experimental research that had been published in peer-reviewed journals in English and that examined inclusive education variables and children and youths with severe disability (from birth to 18 years old).

2.3.1. Exclusion criteria

Studies involving participants older than 18 years or studies that did not report participants to have a severe disability were excluded, unless data for younger participants or participants with severe disability were reported separately.

2.3.2. Data extraction

A data extraction form was developed to extract data on the following: (a) title; authors and date of publication; (b) purpose of the study; (c) definition of inclusive education; (d) participants (number, age, gender, disability description/diagnosis/co-occurring impairments, severity); (e) setting (preschool, school); (f) intervention research design (experimental or quasi-experimental research design [non-randomised, group, and single subject design], qualitative designs, mixed-

Table 2. Selection criteria for inclusion and exclusion of studies

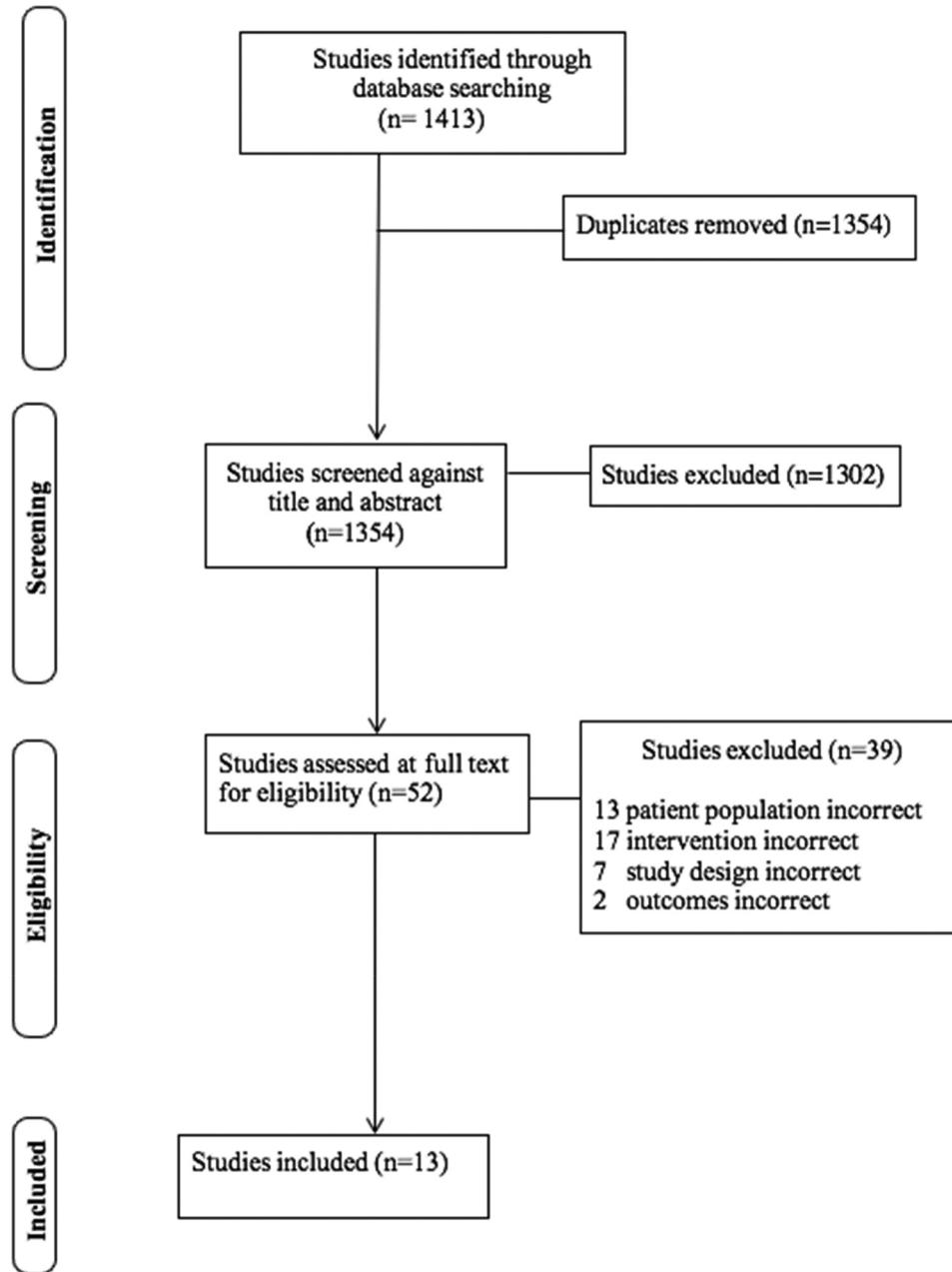
Criteria	Inclusion criteria	Exclusion criteria
Population (age)	Children (0–18 years)	Adults above 18+ years
Population (diagnosis)	Children with a description of intellectual disability that is combined with one of these: – a physical or motor impairment – sensory impairment (vision or hearing loss) – health condition (e.g., epilepsy) Brady et al. (2016), Sylvester et al. (2017).	Children with: – typical development – at-risk due to biological and environmental factors
Intervention	Intervention is any systematic effort to improve how children with severe disabilities can enhance their physical and emotional inclusion in educational setting	Interventions that do not focus on inclusive education for children with severe disabilities Intervention focused in inter-disciplinary or inter-professional collaboration, professional development activities, professional attitudes, professional or parent perspectives, parent support group
Design	Primary data from empirical intervention studies with: – Experimental or quasi-experimental research design (including non-randomised, group and single subject design) – Qualitative design – Mixed-methods – Case studies Schlosser et al. (2007)	Secondary data from: – Literature reviews, systematic reviews, meta-analysis, scoping reviews
Source type	– Peer-reviewed journal articles	– Expert opinion – Opinion pieces, policy reviews, editorials, magazine articles – Conference presentations – Published Masters or Doctoral dissertations and theses
Time period and language	Publications between January 2001 and December 2020 in English	All publications prior to 2001 Non-English
Outcome	All outcomes on child level	All outcomes on other than child level

methods, case study); (g) intervention characteristics: instructional format (direct/indirect, group/individual), administration (implemented by teacher, support staff, SLP, parent, communication partner), dosage (number of sessions), communication outcomes, outcome measure (measuring instrument), main findings; (h) intervention components: type of intervention or intervention approach (e.g., peer interaction). All the data extraction was checked by a co-author, and disagreements were resolved via consensus building.

2.3.3. Data synthesis

The data from included studies were summarised using text and tables to compare and contrast findings across studies. A narrative synthesis was undertaken to address the primary aims of the review. This included textual descriptions of studies, groupings and clusters, and tabulation. It also included a summary of the characteristics of the participants (i.e., disability, the severity of the disability, comorbidity, age); identification of outcomes, predictors measured and results; and whether there was evidence of strength and direction of the effect of the intervention. In addition, we summarised the volume (number of studies, participants, and participant groups). The narrative

Figure 1. PRISMA flow diagram of study selection (Tricco et al., 2018).



synthesis was used to consider patterns in outcomes (along with variations across populations and settings/situations) and to provide guidance with regard to interventions for including children with severe disabilities in inclusive education. The robustness of the synthesis was critically reflected on during the synthesis process.

3. Results

3.1. Selection of studies

Figure 1 depicts the 1413 studies identified in the review. Following automatic deduplication on Covidence and screening at title and abstract level, 52 studies were screened at the level of full text. At the level of full-text screening, a majority of studies were excluded due to the following reasons: not focusing on children with severe disabilities ($n = 13$); incorrect study design ($n = 2$); not

focused on inclusive education as an intervention ($n = 17$); and outcomes not focused directly on children with severe disabilities ($n = 2$). A final corpus of 13 studies were included in this review and are summarised in Table 3. Each of the included studies is summarised according to its authors, year of publication and country of origin, aims, participant population, research design, type of setting, definition of inclusive education, focus of inclusive education, type of intervention, and intervention outcomes.

3.2. General characteristics of studies

The 13 studies included in this review were published between 2001 and 2019. Specifically, six of these studies were published between 2001 and 2010 (Agran et al., 2005; Gilberts et al., 2001; Hunt et al., 2003, 2004; McDonnell et al., 2001; Papageorgiou et al., 2008). The other seven studies were published between 2011 and 2019 (Ainsworth et al., 2016; Biggs et al., 2017; Bonati & Dymond, 2019; Brock & Carter, 2016; Brock et al., 2016; Huber et al., 2018; Loman et al., 2018).

Of the reviewed studies, twelve had been conducted in the United States of America and one in Cyprus (Papageorgiou et al., 2008). This information was ascertained from the description of the school setting in each of the studies. In the majority of studies, researchers employed quantitative methods using a single-subject experimental design ($n = 11$) or qualitative methods involving case studies or multiple qualitative methods ($n = 2$). The sample size of children with severe disabilities reported in the reviewed studies ranged from the lowest of three participants (Bonati & Dymond, 2019; Huber et al., 2018; Hunt et al., 2003; Loman et al., 2018; McDonnell et al., 2001; Papageorgiou et al., 2008) to the highest of eight participants (Ainsworth et al., 2016). Within this sample size, range was four (Biggs et al., 2017; Brock & Carter, 2016; Brock et al., 2016), five (Gilberts et al., 2001), and six participants, respectively (Agran et al., 2005; Hunt et al., 2004).

3.2.1. Characteristics of children with severe disabilities in inclusive education research

In total, 55 children with severe disabilities had been sampled – 38 males and 17 females. Altogether, ten studies reported on children with severe disabilities in the age range 10–16 years ($n = 10$), and one study each reported on children in the age range 8–9 years (Loman et al., 2018) and 3–5 years (Hunt et al., 2004). The age range of the participants was not indicated in one of the studies (Hunt et al., 2003).

In nine studies, the severity of disability was classified as severe (Ainsworth et al., 2016; Biggs et al., 2017; Brock & Carter, 2016; Brock et al., 2016; Gilberts et al., 2001; Huber et al., 2018; Hunt et al., 2003, 2004; Loman et al., 2018). In these nine studies, a severe disability classification was based on several factors, including a diagnosis of intellectual disability combined with behavioural and attentional challenges (Brock & Carter, 2016; Gilberts et al., 2001), intellectual disability and a genetic syndrome (e.g., Down Syndrome, Angelman Syndrome) (Ainsworth et al., 2016; Biggs et al., 2017; Loman et al., 2018), intellectual disability and Autistic Spectrum Disorder (ASD) (Brock et al., 2016; Huber et al., 2018), and ASD with Cerebral Palsy (Hunt et al., 2003, 2004).

In four studies, the severity of disability of the children was classified as moderate to severe (Agran et al., 2005; Bonati & Dymond, 2019; McDonnell et al., 2001; Papageorgiou et al., 2008). In these four studies, children with moderate-to-severe disabilities were diagnosed as having multiple disabilities, including developmental disability and autistic spectrum disorder (Agran et al., 2005; Bonati & Dymond, 2019), or developmental disability with visual impairment (Papageorgiou et al., 2008) or communication impairment (McDonnell et al., 2001).

3.3. Types of educational settings in which research was performed

Most of the studies ($n = 11$) were conducted in a general school setting where children with severe disabilities received academic support based on their individualised educational plans (IEPs) but attended one or more classes together with children without disabilities (e.g., art or music lessons). Of these 11 studies, the school settings included early childhood education/preschool ($n = 1$) (Hunt et al., 2004), elementary school ($n = 1$) (Hunt et al., 2003), middle school ($n = 4$) (Biggs et al., 2017;

Table 3. Summary of reviewed studies on inclusive education of children with severe disabilities (CWSD)

Author, date, country	Study design	Participant (children) characteristics: severity, diagnosis, age	Educational setting	Research objective	Educational outcomes	Educational outcome measure
Agran et al. (2005) USA	Single-subject design	Moderate to severe disabilities, DD & ASD, 13–15 years	Junior high school	Self-monitoring strategy on following-direction skills	CWSD able to follow directions in general education and special classrooms	Procedural checklists, coding of behaviours, social validation (teacher)
Ainsworth et al. (2016) USA	Single-subject design	Severe disabilities, ID & genetic syndrome, 11–16 years	Special education (segregated)	Direct instruction with structured curriculum to improve phonics acquisition	Improved letter-sound correspondence	Multiple-choice literacy questions, Procedural checklists
Biggs et al. (2017) USA	Single-subject design	Severe disabilities, ID & genetic syndrome, 10–16 years	Middle school	Collaborative planning and peer support in inclusive classrooms	Improved social communication and peer interaction skills	Procedural checklists, coding of behaviours, social validation (CWSD, peers, teacher)
Brock and Carter (2016) USA	Single-subject design	Severe disabilities, ID & behavioural/challenges, 10–14 years	Middle school	Teacher-delivered training for paraprofessionals to implement peer support	CWSD improved social interaction with peers, maintained academic engagement	Procedural checklists, coding of behaviours, social validation (teacher, paraprofessionals)
Loman et al. (2018) USA	Single-subject design	Severe disabilities, ID & genetic syndrome, 8–9 years	Inclusive school-wide settings	Teacher strategies to help CWSD benefit from behaviour supports	Decreased problem behaviours	Procedural checklists, coding of behaviours, social validation (teacher)
Bonati and Dymond (2019) USA	Qualitative (Multiple case study)	Moderate to severe disabilities, DD & ASD, 14–16 years	Special education (segregated)	CWSD participation in a community-based food-pantry aligned to curriculum goals (experiential service-learning)	Partial participation. Insufficient communication and behaviour support provided by community members	Self-developed guiding questions (focus group), observational data and field notes

(Continued)

Table 3. (Continued)

Author, date, country	Study design	Participant (children) characteristics: severity, diagnosis, age	Educational setting	Research objective	Educational outcomes	Educational outcome measure
Gilberts et al. (2001) USA	Single-subject design	Severe disabilities, ID & behavioural/attentional challenges, 12–15 years	Middle school	Peer-mediated self-monitoring instruction	CWSD improved self-monitoring of their academic performance	Procedural checklists, coding of behaviours, social validation (teachers, CWSD)
Huber et al. (2018) USA	Single-subject design	severe disabilities, ID & ASD, 15 years	General high school	Peer support as an alternative to paraprofessional support	Improved academic engagement, increased social initiations for some CWSD	Procedural checklists, coding of behaviours, social validation (CWSD, peers, teacher)
Hunt et al. (2003) USA	Single-subject design	severe disabilities, ASD with CP, age not specified	Elementary school	Collaborative teaming process for academic and social participation in CWSD	Decreased non-engagement, increased interaction and academic performance	The Interaction and Engagement Scale, ecological validity (team perspectives)
Hunt et al. (2004) USA	SSED	severe disabilities, ASD with CP, 3–5 years	Preschool	Collaborative teaming process models for children with severe disabilities in preschool	Decreased non-engagement, improved interactions	The Interaction and Engagement Scale, ecological validity (team perspectives)
McDonnell et al. (2001) USA	SSED	Moderate to severe disabilities, DD & communication impairment, 13–15 years	Junior high school	Instructional package: peer tutoring, multi-element curriculum, accommodations	Improved academic responding and decreased competing behaviours	Code for Instructional Structure and Academic Response- Mainstream Version (MS- CISSAR) (Carta et al., 1988), weekly post-tests on academic context areas

(Continued)

Table 3. (Continued)

Author, date, country	Study design	Participant (children) characteristics: severity, diagnosis, age	Educational setting	Research objective	Educational outcomes	Educational outcome measure
Papageorgiou et al. (2008) Cyprus	Qualitative	Moderate to severe disabilities, DD & visual impairment, 11–12 years	Mainstream school	Interaction between children with multiple disabilities and visual impairment, and children in mainstream school	Social-emotional (happy, fear) when integrated with typically developing peers	Box of Emotion, “Rainbow” (observation measure developed by Papageorgiou and Vlamis, 2003, 2007)
Brock et al. (2016) USA	SSED	Severe disabilities, ID & ASD, 10–13 years	Middle school	Teacher-delivered training model for peer support	Interaction (verbal or nonverbal communicative behaviour towards peers)	Procedural checklists, coding of behaviours, social validation (peers only)

ASD: Autistic Spectrum Disorder; DD: Developmental Disabilities; ID: Intellectual Disabilities.

Brock & Carter, 2016; Brock et al., 2016; Gilberts et al., 2001), junior high school ($n = 2$) (Agran et al., 2005; McDonnell et al., 2001), and general high school ($n = 1$) (Huber et al., 2018). In the study by Loman et al. (2018), children with severe disabilities received academic support in a self-contained classroom with limited exposure to peers without disability, but the study actually focused on inclusive school-wide settings accessible to all children (e.g., the cafeteria). One study reported on the integration of children in a mainstream school with children with severe disabilities and visual impairment (Papageorgiou et al., 2008). Two studies reported on research conducted in schools that specifically catered for special education of children with severe disabilities (Ainsworth et al., 2016; Bonati & Dymond, 2019).

3.4. Research objectives and the core outcomes

As summarised in Table 4, the reviewed studies were assembled into five themes based on their focus and aim related to inclusive education. The studies are described in relation to the main research objectives, core outcomes, and reported effectiveness of results.

The first theme focused on *multicomponent-packaged interventions* for children with severe disabilities in inclusive educational settings ($n = 3$). Three studies on packaged interventions targeted academic outcomes (literacy) (Ainsworth et al., 2016), social-emotional skills (Papageorgiou et al., 2008), and peer tutoring and academic support (McDonnell et al., 2001). Ainsworth et al. (2016) implemented the letter-sound correspondence component of the packaged Accessible Literacy Learning curriculum (ALL) (Mayer Johnson). The results of their study showed an increase in letter-sound correspondence in three of the four children with severe disabilities when direct instruction was provided using the structured ALL curriculum literacy component (Ainsworth et al., 2016).

In contrast, Papageorgiou et al. (2008) developed and piloted a 10-week programme to facilitate the integration of children with severe disabilities and visual impairment into daily activities with typically developing children in a mainstream school setting. The programme focused on encouraging respect and acceptance between the two groups of children and assisted them to work together, providing opportunities to express their views about the programme and to make a teacher evaluation. The groups of children mutually benefited from the inclusive educational experience, as noted in their perceived satisfaction and enjoyment of the experience. McDonnell et al. (2001) developed an instructional package focused on classroom-wide peer tutoring and curriculum-based accommodations. They noted improvement in academic responding, reduced competing behaviours, and greater participation of children with severe disabilities in the general educational curriculum.

Two studies focused on the second theme related to *team collaboration teaming to facilitate inclusion of children with severe disabilities in general classrooms* ($n = 2$). Hunt et al. (2004) reported on two studies to highlight the effectiveness of a collaborative team approach for the educational, communication, and social outcomes of children with severe disabilities in general preschool settings. The team consisted of a speech-language therapist, early childhood as well as general educators, instructional assistants, and parents who collaboratively developed and implemented Unified Plans of Support (UPS) for children with severe disabilities. Hunt et al. (2003) also investigated the effectiveness of a collaborative team approach for children with severe disabilities in an elementary school setting and reported improved engagement and participation of children with severe disabilities in class activities in an inclusive educational setting.

The third theme related to the *inclusion of children with severe disabilities in a community-based educational activity* ($n = 1$). Bonati and Dymond (2019) reported on the participation of high school children with severe disabilities in a service-learning experience (i.e., volunteering services at a community-based food pantry). This experience provided an opportunity for children with severe disabilities to blend their curriculum goals (in this case, Jewish values and functional communication skills) with a community-based activity. A reported barrier to the success of the service-

Table 4. Studies categorised within themes related to inclusive education focus and definition

	Inclusive education focus	Authors, year	Inclusive education definition	Domains/ outcomes targeted
Theme 1	Multicomponent packaged interventions implemented in inclusive education settings	Ainsworth et al. (2016)	Inclusion as academic and literacy needs of *CWSD only	Cognitive (Literacy-learning, letter-sound correspondence)
		Papageorgiou et al. (2008)	Inclusion as placement of CWSD in an inclusive environment with peers without disabilities	Social-emotional
		McDonnell et al. (2001)	Inclusion as behavioural and academic needs of all children: both CWSD and peers without disabilities	Behavioural and academic
Theme 2	Team collaboration to facilitate inclusion of children with severe disabilities	Hunt et al. (2004)	Inclusion as CWSD are members of the same classrooms and community settings as their typically developing peers	Behavioural (engagement)
		Hunt et al. (2003)	Inclusion as all children being educated with their peers in age-appropriate inclusive classrooms within their community schools	Behavioural (engagement, participation, social interaction)
Theme 3	Inclusion in a community-based educational activity	Bonati and Dymond (2019)	Inclusion as service-learning that blends classroom instruction with community service	Behavioural, social-emotional, communication
Theme 4	Self-management and positive behavioural interventions	Agran et al. (2005) Gilberts et al. (2001)	Inclusion as CWSD self-directed learning in the general classroom	Behavioural (self-monitoring)
		Loman et al. (2018)	Inclusion as behaviour of CWSD in an inclusive school environment	Behavioural (problem behaviours and behavioural expectations)
Theme 5	Peer support arrangements within inclusive classrooms	Brock et al. (2016); **Brock et al. (2016), Huber et al. (2018); Biggs et al. (2017)	Inclusion as peers without disabilities supporting CWSD in an inclusive classroom	Behavioural (social interaction, academic engagement)

Notes: *CWSD: Children with Severe Disabilities, **Brock and Carter (2017) also focused on a multi-component packaged intervention. Due to its specific focus on peer interaction, this study is categorised under theme 5: peer support arrangements.

learning experience was the limited communication and behaviour support that community members and paraprofessionals provided to children with severe disabilities.

Three studies focused on the fourth theme, which is related to *self-management and positive behavioural interventions* ($n=3$). The self-monitoring strategies of children with severe disabilities were targeted in two studies (Agran et al., 2005; Gilberts et al., 2001). While Agran et al. (2005) reported on self-directed strategies to promote self-monitoring, Gilberts et al. (2001) reported on peer-delivered strategies to promote self-monitoring of children with severe disabilities.

The authors in both studies reported the benefits of self-monitoring strategies that enable children with severe disabilities to follow directions in class activities (Agran et al., 2005) and to increase their classroom-based participation (Gilberts et al., 2001). Loman et al. (2018), on the other hand, evaluated strategies implemented by general classroom and special education teachers to assist children with severe disabilities who display problem behaviours. Specifically, a Schoolwide Positive Behavioural Interventions and Supports (SWPBIS) approach included behavioural support strategies that were integrated into lesson plans (e.g., social stories). The authors reported that all the children with severe disability reduced their problem behaviours following the teachers' promotion of positive behavioural strategies and behavioural expectations within inclusive schoolwide settings (e.g., recess line-up).

Four studies related to the final theme on *peer support arrangements within inclusive classrooms* ($n=4$). In two of the studies, Brock et al. (2016), and Brock and Carter (2016) evaluated the effectiveness of professional development training for paraprofessionals to facilitate peer support for children with severe disabilities. Peer support specifically for children in high school (Huber et al., 2018) and in middle school (Biggs et al., 2017) was reported in two other studies. Across all four studies, improvement in the social and academic outcomes (e.g., peer interaction between children with severe disabilities and their typically developing peers) was reported for some children with severe disabilities following peer support interventions (Biggs et al., 2017; Brock & Carter, 2016; Brock et al., 2016; Huber et al., 2018).

3.5. Educational outcome measures

As summarised in Table 3, seven studies assessed outcomes related to peer interactions and academic engagement (e.g., social interaction, non-engagement, engagement, problem behaviour) (Agran et al., 2005; Biggs et al., 2017; Brock & Carter, 2016; Brock et al., 2016; Gilberts et al., 2001; Huber et al., 2018; Loman et al., 2018). In two studies, outcomes related to academic progress were measured through multiple-choice literacy questions (Ainsworth et al., 2016) and weekly post-tests on specific content areas (McDonnell et al., 2001). Furthermore, McDonnell et al. (2001) also measured outcomes of academic responding (e.g., reading) and competing behaviours (e.g., disrupting academic tasks) by administering the *Code for Instructional Structure and Academic Response—Mainstream Version (MS-CISSAR)* (Carta et al., 1988).

In two studies (Hunt et al., 2003, 2004), social interaction was measured by using *The Interaction and Engagement Scale*. Furthermore, these two studies also measured the academic progress of children with severe disability through interviews with the collaborative team (i.e., teachers) (Hunt et al., 2003, 2004).

In two studies, observational measures were used to assess student participation in educational activities in different ways (Bonati & Dymond, 2019; Papageorgiou et al., 2008). An observational protocol focused on student participation, the curriculum, and educational context was developed by Bonati and Dymond (2019) to conduct focus group interviews with teachers and paraprofessionals. On the other hand, Papageorgiou et al. (2008) used an observation outcome measure called "*Rainbow*" to observe the participation in joint activities by children with severe disabilities and visual impairment, and their typically developing peers. Furthermore, a *Box of Emotion*

containing cloths of various textures and colours enabled children with visual impairments to express their feelings about the inclusive education intervention (Papageorgiou et al., 2008).

Across the intervention studies ($n = 11$), interventions were assessed for procedural fidelity and social validity. In eight of these studies, researchers developed procedural checklists to measure the reliability of implementing their treatment protocols (Agran et al., 2015; Ainsworth et al., 2016; Biggs et al., 2017; Brock & Carter, 2016; Brock et al., 2016; Gilberts et al., 2001; Huber et al., 2018; Loman et al., 2018).

Seven studies assessed social validity with different social validation measures (e.g., Likert scales, interviews, questionnaires) (Agran et al., 2005; Biggs et al., 2017; Brock & Carter, 2016; Brock et al., 2016; Gilberts et al., 2001; Huber et al., 2018; Loman et al., 2018). Three studies examined social validation on satisfaction and acceptability from teachers or paraprofessionals (Agran et al., 2005; Brock & Carter, 2016; Loman et al., 2018), while one study focused on peers' perspectives only (Brock et al., 2016). In three studies, social validation measures were obtained from the perspective of children with severe disability using adapted questionnaires with yes/no responses (Huber et al., 2018), direct verbal questions (Biggs et al., 2017) and a Likert-type scale (Gilberts et al., 2001).

Finally, two studies also measured ecological validity of implementing collaboratively planned interventions within a natural inclusive school setting from the perspective of professional team members (Hunt et al., 2003, 2004).

4. Discussion

The aim of the study in hand was to review research on inclusive education for children and youth with severe disabilities as published in peer-reviewed articles. The study intended to address the challenges with regard to research on social and academic inclusion for children with severe disabilities. These children are seldom included in general education (European Agency for Special Needs and Inclusive Education, 2018), and several researchers pointed to the scarcity of research on inclusion for them (Colley, 2020; Dell'anna et al., 2020).

During our scoping review, we found 13 studies from which only 11 had been conducted in general school settings. This may be attributed to the inadequate implementation of complete inclusion of children with severe disabilities globally (Dell'anna et al., 2020). Whilst most studies aligned with the general principles of inclusive education by fostering integration among children regardless of personal attributes, inclusion occurred at varying degrees. In the majority of studies, children with severe disabilities mostly received academic support in small groups outside of the class, but were integrated with children without disabilities in some general classes (e.g., art or music lessons) (Agran et al., 2005; Biggs et al., 2017; Brock & Carter, 2016; Brock et al., 2016; Gilberts et al., 2001; Huber et al., 2018; Hunt et al., 2003, 2004; McDonnell et al., 2001). On the other hand, an intervention targeting academic outcomes was conducted in a segregated school for students with severe disabilities (Ainsworth et al., 2016),

This finding further corroborates the concerns of academics concerning the scarcity of research for children with severe disabilities. Twelve of the studies were conducted in the United States of America and one study in the European context, thus indicating a clear paucity of research in European, Asian, African, and Australian/Oceanian contexts.

The interventions encompassed three multicomponent-packaged interventions (Ainsworth et al., 2016; McDonnell et al., 2001; Papageorgiou et al., 2008), two interventions with focus on team collaboration in inclusive education (Hunt et al., 2003, 2004), three self-management and positive behavioural interventions (Agran et al., 2005; Gilberts et al., 2001; Loman et al., 2018), four interventions on peer support arrangements (Biggs et al., 2017; Brock & Carter, 2016; Brock et al., 2016; Huber et al., 2018), and one intervention focused on a community-based educational

activity (Bonati & Dymond, 2019). The results are similar to those of a previous review by Kuntz and Carter (2019) that included children with mild, moderate, and severe intellectual disabilities. Thus, the findings of the review reported in this study further validated the use of multicomponent interventions as well as interventions involving self-management and peer support arrangements for children with severe disabilities.

Multicomponent interventions in this review included (a) a comprehensive literacy curriculum, (b) the targeting of multiple literacy skills (Ainsworth et al., 2016), (c) a class-wide peer tutoring system combined with a multi-tiered curriculum and accommodations of children's unique needs (McDonnell et al., 2001), and (d) a 10-week programme aimed at children's participation in common daily activities in mainstream schools (Papageorgiou et al., 2008). According to Kuntz and Carter (2019), multicomponent interventions may be needed to address the full range and complexity of the needs of children with severe disabilities. However, it may be difficult to disentangle the unique effects of the strategies within the multicomponent programmes. Future research may need to further investigate the cumulative and unique effects of multicomponent interventions for these children.

Hudson et al. (2013), in their review of academic interventions for children with severe and moderate intellectual disabilities, found a paucity of interventions to promote these children's academic progress. In our review, only two studies focused on outcomes of academic progress as assessed through multiple-choice questions in literacy (Ainsworth et al., 2016) and weekly post-tests (including questions in specific content areas) (McDonnell et al., 2001). The majority of studies focused on academic engagement defined attending to activities (Biggs et al., 2017; Brock & Carter, 2016; Huber et al., 2018; Hunt et al., 2003, 2004) or behaviours related to success in the classroom as "classroom survival skills" (Gilberts et al., 2001). Two studies explored the academic progress of children with severe disabilities by means of interviews with their teachers (Hunt et al., 2003, 2004). This means that, although not directly targeting children's academic progress, many of the included studies addressed their engagement in academic activities. However, given the challenges of support to children's academic learning in inclusive settings (Hudson et al., 2013), the review highlighted the need for addressing the academic progress of children with severe disabilities more directly.

To deal with the challenges of social inclusion identified in the previous research (Dell'anna et al., 2020; Hardiman et al., 2009; Szumski & Karwowski, 2014), four studies in this review focused on interventions in peer support arrangements. Huber et al. (2018) explored the effectiveness of peer support arrangements through which peers without disabilities provided social and academic support to children with disabilities. The authors focused specifically on peer partners and paraprofessionals as facilitators of peer support. Three studies (Biggs et al., 2017; Brock & Carter, 2016; Brock et al., 2016) explored the effectiveness of training to paraprofessionals in implementing steps in peer support arrangements and procedures. All four interventions have since led to improvements in social and academic outcomes for children with severe disabilities. These studies are important, given the potential of peer support (Chung et al., 2012; Therrien et al., 2016) and the scarcity of research on interactions between children with severe disabilities and their typically developing peers (Nijs & Maes, 2014). Additionally, these studies emphasise the benefit of professional development opportunities for increasing the specific knowledge and skills of teachers and paraprofessionals on specialised interventions (e.g., behaviour management) (Biggs et al., 2017; Brock & Carter, 2016; Brock et al., 2016). Furthermore, ensuring optimal implementation of interventions for students with severe disabilities may require a team approach that involves collaboration between teachers, parents, educational assistants, and other relevant stakeholders in the school setting (Hunt et al., 2003, 2004).

Previous research pointed to the heterogeneity in severe disabilities (Wilder et al., 2015) as well as co-occurring health conditions and diagnoses (Axelsson et al., 2013; Lancioni et al., 2018), which result in complex needs in respect of adaptations in school settings. In this study, the participants had moderate-to-severe disabilities co-occurring with other disabilities such as intellectual disability and a genetic syndrome (Ainsworth et al., 2016; Biggs et al., 2017; Loman et al.,

2018), or intellectual disability and ASD (Brock et al., 2016; Huber et al., 2018). We could not find studies where the students were described to have profound intellectual and multiple disabilities (PIMD). This indicates that inclusive education for the target group of students with severe disabilities does not include students with the most severe disabilities. The majority of the participants were in the age range 10–16 years old ($n=11$), while fewer were in the age range 3–9 years old ($n=2$). During adolescence, the educational context changes, as the curriculum becomes more challenging and peer relationships play a new role in children's everyday lives (Carter, 2018). A focus on children with severe disabilities in the age range 10–16 therefore appears to be justified. However, based on the current review, there is a need for studies encompassing different age groups.

In the intervention studies, procedural fidelity was assured through observations and procedural checklists (Huber et al., 2018; Agran et al. 2015; Ainsworth et al., 2016; Biggs et al., 2017; Brock & Carter, 2016; Loman et al., 2018). Social validity was investigated in the majority of the studies through interviews or questionnaires with teachers and paraprofessionals (Agran et al., 2005; Brock & Carter, 2016; Hunt et al., 2003, 2004; Loman et al., 2018), as well as peers (Biggs et al., 2017; Brock et al., 2016). Interestingly, some studies evaluated the social validity of interventions by obtaining views of students with severe disabilities (Biggs et al., 2017; Gilberts et al., 2001; Huber et al., 2018). A study by Papageorgiou et al. (2008) used a multimethod approach that included emotional evaluations, interviews, observations, and discussions. The researchers used the evaluation method *Box of Emotions* to investigate the emotional impact of the programme not only on peers but also on children with multiple disabilities in the study. Students themselves should be socially involved in interventions and their experiences and perceptions should be accounted for. However, children with severe disabilities often have a significant delay in their development of speech and language skills, which affects their communication abilities (De Bortoli et al., 2014). Thus, there accessing children's perspectives appears to be a challenge in intervention research with children with severe disabilities. The social validation procedures used in the studies in this review point to the possibility of and the need for considering the voices of children with severe disabilities in the interventions that concern them.

5. Limitations of the study

Publication and language biases are acknowledged as primary limitations of this review, as only studies published in English were accepted for inclusion. As such, numerous current and relevant non-English publications printed in various parts of the world were excluded. The findings of this review should consequently be interpreted cautiously, as studies that could not be accessed online or those published in other languages could well have contributed significantly to the results of our review.

6. Implications for special education

Four key areas for future research have been highlighted by this scoping review. Firstly, there is a need for further research to focus on using intervention studies to facilitate the inclusion of children with severe disabilities in education. Secondly, there is a specific need to focus on interventions that facilitate academic progress in children with severe disabilities. Thirdly, methodologically, single-subject research design and randomised control group design have the potential to provide greater evidence for intervention studies. Fourthly, research on outcomes related to inclusion in general education settings should also be prioritised for future investigation. Finally, research on intervention studies focused on the inclusion of children with severe disabilities in European, Asian, African, and Australian/Oceanian contexts is a current research priority.

7. Conclusion

This review presented a research overview of interventions that support the inclusion of persons with severe disabilities in educational settings. A scoping review was adopted in searching the literature and synthesising the available studies to highlight research trends and gaps. The majority of the included studies focused on interventions to increase engagement, positive

behaviour management, and social inclusion as outcomes. There was limited emphasis on studies focusing on improving academic outcomes. Research trends—and more importantly, the gaps highlighted in this research review—highlight a set of current priorities that are necessary for advancing the inclusion of children with severe disabilities in education. The scoping review did not find intervention studies about inclusive education for students with the most severe disabilities, namely students with PIMD. This should be noted for future research and in societal and scientific discussions about inclusive education for all students.

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