Scandinavian Journal of Educational Research

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/csje20

Educational Approaches to Improve Communication Skills of Learners with Autism Spectrum Disorder and Comorbid Intellectual Disability: An Integrative Systematic Review

Kamilla Klefbeck

To cite this article: Kamilla Klefbeck (2021): Educational Approaches to Improve Communication Skills of Learners with Autism Spectrum Disorder and Comorbid Intellectual Disability: An Integrative Systematic Review, Scandinavian Journal of Educational Research, DOI: 10.1080/00313831.2021.1983862

To link to this article: https://doi.org/10.1080/00313831.2021.1983862

© 2021 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group

Published online: 18 Oct 2021.

Submit your article to this journal

Article views: 173

View related articles

View Crossmark data

Full Terms & Conditions of access and use can be found at
https://www.tandfonline.com/action/journalInformation?journalCode=csje20

SCANDINAVIAN JOURNAL OF EDUCATIONAL RESEARCH
https://doi.org/10.1080/00313831.2021.1983862

Routledge
Taylor & Francis Group

OPEN ACCESS Check for updates

Educational Approaches to Improve Communication Skills of Learners with Autism Spectrum Disorder and Comorbid Intellectual Disability: An Integrative Systematic Review

Kamilla Klefbeck [a,b]

[a]Faculty of Education, Kristianstad University, Kristianstad, Sweden; [b]Faculty of Education, Malmö University, Malmö, Sweden

ABSTRACT

Enabling functional communication is critical for accessibility in school and society for all pupils. This systematic review analyzed the results of educational studies on developing communication skills for learners (≤21 years) with autism spectrum disorder and comorbid intellectual disability. Systematic database searches were conducted using ERIC, MEDLINE, and PsycINFO. Seventeen of 208 peer-reviewed articles in English published between 1990 and 2020 met the inclusion criteria. The analysis identified various educational approaches, ranging from using alternative linguistic tools (e.g., signs and gestures) to physical devices (e.g., visual cues), and also examined instructional approaches used by educators. The synthesis shows heterogeneity of methods used, resulting in weak evidence for any model's impact on this pupil group's communication skills development and concomitant possibilities to affect their school situation. In addition, the analysis demonstrated that personnel performance crucially affects children's opportunities to learn regardless of the approach used. Directions for future research are concluded.

ARTICLE HISTORY
Received 25 July 2020
Accepted 7 September 2021

KEYWORDS
Autism; communication skills; educational approaches; empowerment; intellectual disability; special educational needs

Introduction

The identification of an educational approach that has been tested, is suitable for learners with autism spectrum disorder (ASD) and comorbid intellectual disability (ID) and allows such learners to express themselves in educational settings is a challenge. The right of children to express themselves should not be affected by disabilities; Article 12 of the United Nations Convention on the Rights of the Child (UNCROC) applies to all children (United Nations Commission on Human Rights, 1989). According to the Convention's definition, a child is a person younger than 18 years. However, to avoid excluding individuals on the borderline between childhood and adulthood, the age limit for the current review was set at 21 years, and the terms "children" and "learners" were used interchangeably, as the reviewed studies focus on children in educational settings.

There is a need for ongoing research into how to effectively support communication and language development in children with special educational needs and disabilities (SEND) in order to enable them to contribute to their educational context. Some strategies mentioned to frame the context in the present review, such as Social Stories, also have clinical and other lifestyle applications, but the strong focus in the present review is educational contexts. As stated by Hedegaard-Sørensen (2017), the ability of SEND teachers to cope with educational challenges requires

CONTACT Kamilla Klefbeck kamilla.klefbeck@hkr.se Faculty of Education, Malmö University, Malmö, SE-205 06, Sweden

© 2021 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group
This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

deep knowledge of educational approaches and strategies for solving pedagogical tasks, and knowledge of individual learners' diagnoses. Both ASD and ID are chronic, lifelong disorders. According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013), individuals with ASD typically exhibit impairments in social communication and interaction, including limitations in social-emotional mutuality and non-verbal communicative behaviors, as well as repetitive or restricted patterns of behaviors or interests. ID is characterized by limitations in cognitive and adaptive functioning (APA, 2013). Maenner et al.'s (2020) summary of ASD comorbidity statistics in 8-year-old children in the United States indicates a 33% prevalence of coexisting ASD and ID; therefore, this target group of learners requires considerable instructional supports and adaptations. Research by Feiler and Watson (2011) showed that, for teachers and paraprofessionals attempting to involve children with severe learning and communication difficulties in choice making, the need to hear the child's voice sometimes conflicts with rigid timetables. One of the participants in their study suggested that for children with learning and communicational needs, following decision-making at school could be seen as " … the icing on the cake" (Feiler & Watson, 2011, p. 117). Teachers, paraprofessionals, and parents need information about robust, scientifically proven educational approaches. In a study of alternative communication technologies for young children with complex communication needs, Light and Drager (2007) concluded that further research is needed to determine the best approaches for the development of professional practices and in-service training for educational personnel to affect outcomes for children with complex communication needs.

Communication and SEND

Communication strategies for learners with SEND often involve the use of images, objects, and symbols. Concrete communicative representations are important for students with IDs and/or ASDs to facilitate independent task initiation and transitions between activities (Koyama & Wang, 2011). Browder et al. (2009) state that the development of communicative competence is essential for students with IDs to participate in teaching and learning programs. For students with moderate to severe IDs, both teacher expectations and the quality of the instructions given are crucial for the development of communication (Browder et al., 2009). Hence, there is a synergistic connection between communication and engagement in learning more generally.

Methods Used to Enhance Communication for SENDStudents

Several reviews have systematized methods used to enhance communication for SEND students at school. Although none of these reviews exclusively focus practice research on an educational context targeting communication development for students with dual ASD and ID, several mention aspects that are important to this target group. For example, clarifying pictures, and Social Stories are frequently used to facilitate communication in schools, homes, and daycare centers for individuals with ASD. Qi et al.'s review (2018) indicated a relation between measured target behaviors for individuals with ASD and the implementation of Social Stories, but the authors did not consider Social Stories to be an evidence-based practice, according to their analysis approach. Another meta-analysis of research on students with either ASD or ID examined the use of a picture exchange communication system, PECS (Hart & Banda, 2010) and highlighted the importance of taking advantage of the specific strengths of individuals with functional disabilities. An earlier meta-analysis by Bellini and Akullian (2007) of studies on children and adolescents with ASD indicated that video modeling and video self-modeling (VSM) interventions were effective in addressing social communication skills. In addition, Kaiser and Roberts (2011) investigated language development in young children with language impairments, and highlighted the benefits of teaching parents, teachers, and peers as communication partners to reinforce naturalistic communication. Most relevant in the present review is Wong et al.'s (2015) comprehensive review of evidence-based educational research from

between 1990 and 2011 for individuals aged 0–22 years with ASD. This was followed by Hume et al.'s (2021) study, which included research published from 2012 to 2017. A matrix included in Wong et al. (2015) provides information about how to individualize evidence-based educational practice for each specific autistic child with or without co-occurrent ID, as it shows child and youth outcomes categorized by age groups. However, as only 25% of the studies in Wong et al.'s (2015) review and 21% of the studies in Hume et al.'s (2021) review provided information about co-occurring ASD and ID, a research gap is apparent. Therefore, the present review examined relevant previous publications on this topic and sought to extend on this important body of work.

Systematic reviews generally include only experimental studies, and usually only randomized controlled trials, while integrative systematic reviews include both experimental and non-experimental studies (Hart, 2018). The analysis of the present integrative systematic review also focuses on theoretical underpinnings to explain the results of found strategies to enhance children's communication skills. By that, the analysis also examined whether the research reviewed was prospective or retrospective (Nichols, 2015). This means that a retrospective approach examines a particular situation (e.g., lack of communication skills) to determine what has caused the impairment, while a prospective approach addresses the prevention of impairments (e.g., lack of communication skills or opportunities in specific contexts).

Communication Skills

A clear definition of the requisite skills is needed to identify and summarize previous research on educational approaches to develop learners' communication and interaction abilities. One approach to enable the child to better express himself/herself is by recognizing elusive behaviors as communicative, and setting out to teach more functional skills, thereby reducing challenging behaviors. Through applied behavioral analysis (ABA) children's behaviors can be systematically modified by examining the antecedents and consequences of the child's responses (De Rivera, 2008). Children's challenging or elusive expressions can be considered prelinguistic behaviors (Durand & Merges, 2001; Keen et al., 2001) and are valid means of expressing the needs and wants of the individual.

From a pragmatic perspective on learning, the present systematic review aims to investigate processes in which learners gain their "property in the community" (Mead, 1934, p. 199), which is consistent with UNCROC (United Nations Commission on Human Rights, 1989). Therefore, a broader definition of communication was needed that was not aligned to specific approaches or desired behaviors. Kaiser and Roberts (2011) refer to *communication skills*, a term that embraces prelinguistic communication (e.g., pointing, showing, and turn-taking) to address everyday interaction needs. This review therefore uses "communication skills" to define the required aspects on interaction.

Educational Approaches to Enhance Communication Skills

Keen et al. (2005) evaluated teachers' capacity to respond to communicative attempts by children with autism. They found that teachers were able to identify a range of behaviors as communicative but did not always respond when these behaviors occurred. The authors noted that the students' ability to express themselves in the classroom was important and highlighted the need to explore teachers' strategies for responding to learners' communicative attempts. Based on considerations raised by Keen et al. (2005), the educational approaches examined in this review include *indirect approaches,* which address the behaviors of teachers or other communication partners aimed at affecting the communication skills of their learners. *Direct approaches* address the learners themselves. The importance of the educator is linked to the concept of a communication partner. Alwell and Cobb (2009) use the term *communication partner* to emphasize that communication requires reciprocity by at least two people: a sender and a receiver. The idea of examining direct, as well as indirect approaches in the present synthesis of practice research in the context of SEND teaching

relates to Mead's (1934) symbolic interaction theory, where individual's inner and outer development depends on the social reactions received. Mead (1934) states, "gesture is there only in its relationship to the response" (Mead, 1934, p. 189). As Mead's *gesture* includes vocal as well as physical gestures, this statement relates to the core focus on personal rights and communication quality in the present synthesis. The idea of a theoretical perspective in literature syntheses relies on Rumrill et al.'s (2011) statement about its benefits in special educational research, as it enables processes of adaptation to existing theories.

Aim and Research Questions

The aim of this systematic review was to analyze the results of educational research on developing communication skills for learners (≤21 years) with ASD and comorbid ID. Approaches used, and aspects found to be important to develop learners' communication skills were identified. The review was guided by three research questions:

RQ1. How did the educational approaches described in the research affect the development of communication skills for learners with ASD and comorbid ID?

RQ2. What are the predominant theories and methods used in the research conducted?

RQ3. What are the research gaps in this field?

Materials and Methods

This systematic review was part of a research project approved by the Swedish Ethical Review Board (2019-02767). Rumrill et al. (2011) noted that researchers who intend to cover complicated or controversial topics "begin by tracking the history of the issue, then proceed with a description of the concern's current status and its implications for policy and practice" (p. 183). A systematic search was conducted, following the PRISMA guidelines (Page et al., 2021). For clarification of the review process, the reader is referred to Figure 1. The initial inclusion criteria were peer-reviewed articles published in English in scholarly journals. The time parameters commenced from the introduction of the Convention on the Rights of the Child, December 1989.

Inclusion Criteria

(1) Empirical studies (including case studies, single case studies and group design studies) published between 1 January 1990, and 31 December 2020.
(2) Studies focused on educational approaches to develop students' communication skills. If the study focused on another subject (e.g., peers, interactional strategies, literacy), the main purpose of the approach had to be supporting students' communication skills.
(3) Studies conducted in schools or other educational environments.
(4) Research focused on children/youth up to age 21 years with dual ID and ASD or research focused on participants' efforts to develop communication for children/youth with dual ID and ASD.

Exclusion Criteria

(1) Articles published before 1990 and after 2020.
(2) Articles mainly focusing on subjects other than those involving how to develop students' communication skills. These may include for example, (a) attempts to reduce dangerous/

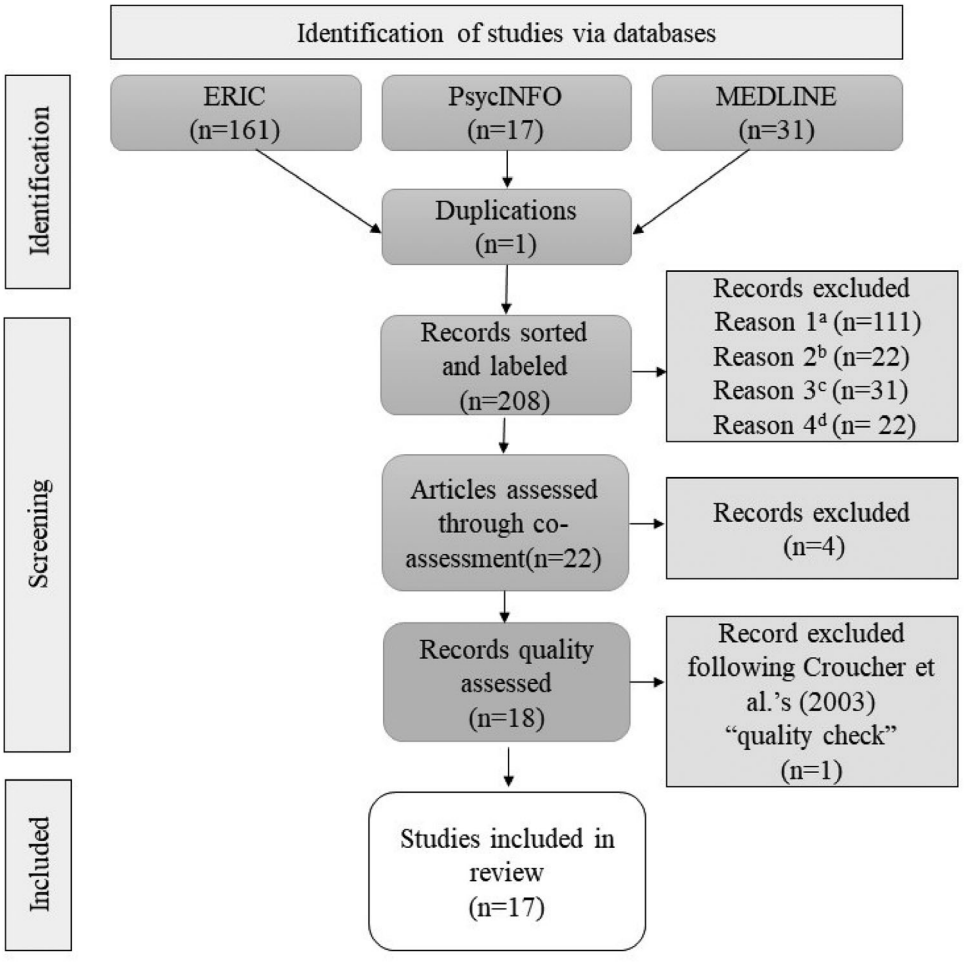

Figure 1. The Study Flowchart.

Note: This figure demonstrates operational steps, from full-text evaluation to final quality assessment. [a] Reason 1= the topic in focus (e.g., medicine/health issues, social inclusion, behavioral problems). [b] Reason 2= outside educational settings, [c] Reason 3= population criteria, d Reason 4=not empirical studies (e.g., literature reviews).

challenging behaviors, (b) students' independence, (c) students' interaction with peers in which the intervention aimed to support the development of students' social lives, (d) health/medical/diagnosis issues, (e) organizational questions, and (f) studies on communication-related topics, such as writing/reading and counting, without a primary focus on communication skills.

(3) Studies outside school settings.
(4) Populations aged over 21 years, and those without dual ID and ASD.
(5) Studies that were not original empirical work, such as philosophical work or ethically questionable research approaches (e.g., facilitated communication, as controlled experiments have shown that this approach is not consistent across facilitation recipients [Ganz et al., 2018]).

As indicated in Figure 1, the first step involved locating the Education Research Information Centre (ERIC) and PsycINFO databases in order to search for relevant educational and

psychological research. Additionally, MEDLINE was searched to identify related research in the medical field. This resulted in some differences in search terms between the databases, but for all the search engines, the search string included "ASD", "communication", and "ID". Alternative search terms used were based on suggestions from each database. Additional keywords were added to broaden the search and obtain more hits. A limiter related to the educational context was used in the ERIC and MEDLINE searches. The databases and search strings are shown in Table 1.

Full-Text Evaluation

In total, 208 identified articles were evaluated. First, the abstracts were read. Then, depending on the complexity of evaluating the content against the inclusion/exclusion criteria, the articles were read in full. Articles that did not meet the inclusion criteria were sorted and labeled according to the exclusion criterion. Based on abstract and full-text evaluation, 111 articles were excluded because they focused on other topics (e.g., health issues or challenging behavior). A further 22 articles were excluded because they were conducted in contexts other than educational settings, 31 were excluded because they did not meet the population criterion, and 22 were excluded because they were not original empirical work. In the next step, a senior researcher and a postgraduate colleague were consulted to co-assess the inclusion/exclusion criteria for several articles ($n = 22$) in which the criteria for inclusion were unclear. Consequently, four of these articles were excluded. Finally, 18 articles remained for subsequent examination of the quality dimensions. The study flowchart (Page et al., 2021) is shown in Figure 1.

Articles Remaining After Quality Check

The 18 articles were evaluated using a quality check schedule developed by Croucher et al. (2003). This schedule review ten disparate aspects of each study (its relevance, theoretical perspectives,

Table 1. Databases and Search Strings.

	Search String				
Database	Autism spectrum disorders	Intellectual disabilities	Communication/ interaction	Educational context	Hits
ERIC	DE "Pervasive Developmental Disorders" OR DE "Asperger Syndrome" OR DE ("Autism") OR (asd OR autism spectrum disorder OR autis*)	DE "Intellectual Disability" OR DE "Down Syndrome" OR DE "Mild Intellectual Disability" OR DE "Moderate Intellectual Disability" OR DE ("Severe Intellectual Disability") OR (mental retardation) OR (retarded)	DE ("Interaction") OR (DE "Communication" (Thought Transfer)) OR (communicat*) OR (interaction)	DE "Educational Environment" OR DE "Classroom Environment" OR DE "College Environment" OR DE ("Teaching Conditions") OR (school*) OR (student*) OR (teacher*) OR (education*)	1161
MEDLINE	Autism OR asd OR (autism spectrum disorder)	(Intellectual disability) OR (mental retardation) OR (intellectual deficiency)	(communication skills) OR (communication strategies) OR (interpersonal interaction)	education or training	31
PsycINFO	MAINSUBJECT.EXACT ("Autism Spectrum Disorders")	MAINSUBJECT.EXACT ("Intellectual Development Disorder")	("Communication Skills Training") OR MAINSUBJECT.EXACT ("Interpersonal Interaction")		17

Note: The table clarifies search strings used to cover the key elements of the research question versus hits achieved in the databases used.

context, sample, data collection, design, analysis, reflexivity, generalizability, and ethics), based on the premise that quantitative and qualitative research should be evaluated against the same sort of criteria. Some aspects in Croucher et al.'s (2003) schedule are defined as essential (e.g., the sample), where others are defined as desirable (e.g., the reflexivity), beneficial to enable comprehension of the findings. To be included, all essential requirements must be achieved. A senior researcher guided the author through the proceeding. Subsequent, one article (Biederman & Freedman, 2007) was excluded because the analysis was not adequately described. After the quality evaluation, 17 articles remained for final analysis. The studies are the units of analysis in the present systematic review. Three articles

Table 2. Included Articles.

Study	Author (year)	Journal	Title
1	Baker-Ramos (2017)	*Inquiry in Education*	Gesture and signing in support of expressive language development
2	Barber (2008)	*European Journal of Special Needs Education*	Using intensive interaction to add to the palette of interactive possibilities in teacher–pupil communication
3	Caldwell (2013)	*Journal on Developmental Disabilities*	Intensive interaction: Using body language to communicate
4	Ganz et al. (2012)	*Behavior Modification*	Effects of peer-mediated implementation of visual scripts in middle school
5	Hamilton and Snell (1993)	*Augmentative and Alternative Communication*	Using the milieu approach to increase spontaneous communication book use across environments by an adolescent with autism
6	Hart and Whalon (2012)	*Education and Training in Autism and Developmental Disabilities*	Using video self-modeling via iPads to increase academic responding of an adolescent with autism spectrum disorder and intellectual disability
7	Hughes et al. (2011)	*Research and Practice for Persons with Severe Disabilities*	Effects of a social skills intervention among high school students with intellectual disabilities and autism and their general education peers
8	Matson et al. (1993)	*Journal of Applied Behavior Analysis*	An evaluation of two methods for increasing self-initiated verbalizations in autistic children
9	McMillan (2008)	*Australasian Journal of Special Education*	Teachers make it happen: From professional development to integration of augmentative and alternative communication technologies in the classroom
10	O'Neill and Sweetland-Baker (2001)	*Journal of Autism and Developmental Disorders*	Brief report: An assessment of stimulus generalization and contingency effects in functional communication training with two students with autism
11	Panerai et al. (1998)	*Education and Training in Mental Retardation and Developmental Disabilities*	Use of structured teaching for treatment of children with autism and severe and profound mental retardation
12	Payne et al. (1995)	*Focus on Autistic Behavior*	Training team members to respond to the communicative behaviors of children with profound handicaps
13	Schaefer et al. (2018)	*Remedial and Special Education*	Effects of peer support arrangements across instructional formats and environments for students with severe disabilities
14	Sturm (2012)	*Topics in Language Disorders*	An enriched writers' workshop for beginning writers with developmental disabilities
15	Tanet et al. (2016) [a]	*Frontiers in Pediatrics*	A developmental and sequenced one-to-one educational intervention for autism spectrum disorder: A randomized single-blind controlled trial
	Tanet et al. (2020) [a]	*BMC Pediatrics*	Developmental and sequenced one-to-one educational intervention (DS1-EI) for autism spectrum disorder and intellectual disability: a two-year interim report of a randomized single-blind multicenter controlled trial.
	Saint-Georges et al. (2020) [a]	*EClinicalMedicine*	A developmental and sequenced one-to-one educational intervention (DS1-EI) for autism spectrum disorder and intellectual disability: A three-year randomized, single-blind controlled trial.

Note: Full author attribution is given in the reference list.
[a]Study 15 includes tree articles (Saint-Georges et al., 2020; Tanet et al., 2020), using the same population proceeded in an interim intervention.

(Saint-Georges et al., 2020; Tanet et al., 2016, 2020) report interim analysis from an intervention in the same population, and those articles were considered as one study. Hence, the synthesis includes 15 studies that were reported in 17 articles. Table 2 shows the included articles.

Results

The reported effects of the educational approaches on learners' development of communication skills were analyzed using a two-step process. First, the educational approaches used were categorized and listed. Thereafter, the outcomes of the educational approaches on learner communication skills were analyzed.

Categories of Approaches Used According to Communication Skills Achieved

Categories of Educational Methods Implemented

The educational methods covered in this review include direct approaches used to enhance learners' communication and indirect approaches used to improve educators' prerequisite skills for enhancing learners' communication. Thirteen studies [1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, and 15] used direct approaches aimed at improving learners' development of communication skills. Nine of the studies examining direct approaches used a single case research design (in which the individual was his/her own control) [1, 4, 5, 6, 7, 8, 9, 10, 13], but six of these studies [4, 7, 8, 9, 10, 13] used a multiple baseline approach. One of the direct approach studies used a group design [15], and two [3, 14] used descriptive case examples to evaluate the direct approaches implemented. Table 3 shows the categories of educational methods implemented in the studies. These studies evaluated instrumental strategies such as tools (e.g., a communication book) or comprehensive programs (e.g., use of the Treatment and Education of Autistic and Related Communication Handicapped Children [TEACCH] concept). Five of these studies focused on direct approaches, but as peer [4, 7, and 13] or teacher [9, 15] performance was also considered, interpersonal resources were used as additions to the direct approach. Two studies mainly focused on staff outcomes [2] or team members' [12] prerequisite skills to respond to learners' expressions. Hence, those studies were defined as *indirect approaches*, as they focused on personnel outcomes. This distinction between direct and indirect approaches is complex, as the findings indicated that educators' responsiveness is crucial, even in studies evaluating direct approaches. One of the included studies [12] provided no information about how the intervention affected students' communication. In this study, Payne et al. (1995) used an indirect approach based on team members' response sensitivity, but no clear

Table 3. Categories of Educational Methods Implemented in the Studies.

Article	Direct													Indirect		*n*=
	1	3	4	5	6	7	8	9	10	11	13	14	15	2	12	15
Communication book				(x)		x										2
Electronic tool, iPad, or SGD					x			(x)				x				3
FCT									x							1
Intensive interaction		x												x		2
Milieu procedure				x									x			2
Peers			x			x					x	x	x			5
Responsivity															x	1
Simple sign and gesture	x															1
TEACCH										x			x			2
Time delay				x			x	x								3
Visual cues			x				x	x	x	x						5
Writers' workshop												x				1

Note: SGD = speech-generating device; FCT = functional communicative training; TEACCH = treatment and education of autistic and related communication handicapped children.

examination of learner improvements was included, as the focus was on team members' enhanced capability for responding to learners' actions. However, as team members' responsiveness and learners' capacity to communicate are closely linked, increased communication skills may be inferred, given the potential for improvement in learners' communication in such relationships.

There were two groups of participants in the included studies: learners with disabilities ($n = 88$) and peers/educators ($n = 64$). Articles 2 and 15 included an unspecified group of educators. The number of learners in the included articles varied from 1 [4, 5, 6, and 12] to 38 [article 15]. Learners were aged between 4–21 years.

All the included studies reported improvements in learners' communication skills along with improvements in the responses of teachers, trained peers, and team members. However, a few studies noted some disagreement. An issue emerged in relation to learners' capacity to maintain communication skills in various situations. Ganz et al. (2012) reported that learners' communication improvements were not sufficiently generalized to be maintained with an untrained peer. Similarly, Schaefer et al. (2018) found no evidence of generalization, as interactions with untrained peers only increased after those settings were directly targeted. Similar findings were reported regarding untrained personnel. For example, Hughes et al. (2011) noted that communication partners sometimes felt unnatural interacting with non-verbal learners. Although teachers, paraprofessionals, or peers were the target population in five of the included studies [2, 4, 7, 12, and 13], the findings indicated that educators' performance was a crucial factor, even in studies that solely focused on learners' development. For example, Baker-Ramos (2017) [1] showed that teachers' response contingency was crucial for how learners adapted signs and gestures, and Hart and Whalon (2012) [6] reported that the nature of teachers' experience was critical in mediating the efficacy of learners' VSM use. O'Neill and Sweetland-Baker (2001) [10] also reported that educators' feelings toward the learner could be important. They highlighted situations in which the educator did not perform well because they were frightened of the learner's large or aggressive appearance.

The included articles covered various educational approaches incorporating *simple sign and gesture* used to facilitate the learners' wants and needs (Baker-Ramos, 2017) [1] and intensive interaction interventions. The studies encompass both direct (Caldwell, 2013) [3] and indirect (Barber, 2008) [2] approaches to learners' development of communication skills. One study that used an indirect approach focused on personnel responses to learner communication; the outcome was the quality of team members' *response sensitivity* (Payne et al., 1995) [12]. There were also *peer-mediated* interventions that used instrumental tools such as visual scripts [4] and a *communication book* (Hughes et al., 2011) [7]. In one study, the peer-supported arrangement itself could be considered an educational approach (Schaefer et al., 2018) [13]. Other studies focused on the *milieu procedure* (Hamilton & Snell, 1993; Saint-Georges et al., 2020; Tanet et al., 2016, 2020) [5 and 15], in which interaction is strategically facilitated in highly developed milieus through prompts, planned responses, time delay, and joint attention. Two studies considered instrumental tools in the form of *electronic equipment,* such as an iPad (Hart & Whalon, 2012) [6] and a speech-generating device (SGD) (McMillan, 2008) [9]. The iPad was used to obtain *self-modeling* instructions and the SGD (McMillan, 2008) [9] was used to make assumptions about learners' frequency of SGD use. The SGD frequency was measured to evaluate the effect of a professional development package on outcomes such as time delay and visual cues. Another older study (Matson et al., 1993) [8] compared the efficiency of *visual cue* fading vs. graduated time delay to increase learners' self-initiated communication, although no technical devices were used. The included studies incorporated both frequently used approaches, such as *functional communication training* (O'Neill & Sweetland-Baker, 2001) [10] and *TEACCH* (Panerai et al., 1998) [11], and less frequently used approaches, such as the *Enriched Writers' Workshop* (Sturm, 2012) [14].

Table 4. Reported Effects on Communication Skills for Each Approach.

Approach	Results found
Direct vs. indirect approaches	All included studies reported correlations between the approach used and learner vs. personnel learning. The use of indirect approaches may be important, as Payne et al.'s (1995) research indicates: experienced staff may respond to fewer communicative attempts from their students compared with less experienced staff. Findings from Payne et al. (1995) and Barber (2008) indicate that the educational approaches enhanced participating educators' responsiveness.
Simple sign and gesture	Results from Baker-Ramos (2017) [1] indicate that for those learners for whom signing was physically possible, the approach provided strategies to enable communication and reinforced learners' ability to be understood. Structured support was crucial to enable learners' development of signs and gestures.
Intensive interaction and personnel responsivity	Barber's (2008) [2] research indicated that professional development training, focusing on team members' ability to recognize learners' interests and respond to their communicative attempts, increased the frequency of teacher–student interaction. Barber did not state whether the enhanced responsivity of staff or the increased communication skills of learners caused the improvement. Similar results were reported in Payne et al. (1995) [12]: after participating in professional development, training team members recognized more learner behaviors as communicative. Caldwell (2013) [3] focused on how educator abilities to attend to learner affective states influenced learner non-verbal conversation.
Peer-mediated interventions	The peer-mediated interventions included instrumental aspects such as visual scripts [4] and a communication book [7]. Ganz et al. (2012) [4] found significant improvement in communicative behavior after an intervention with a trained peer. However, the measured communicative behavior was not sufficiently generalized to be used with an untrained peer. Findings from Hughes et al. (2011) [7] indicated that a combination of communication book and peer-mediated intervention immediately produced increased learner interaction. Participants who could read and verbally respond used the communication book to expand their conversational topics, and non-verbal learners used the book together with gestures. One problem identified was that some communication partners found it unnatural to interact with non-verbal learners. Schaefer et al. (2018) [13] found that a peer-mediated approach could be generalized to non-classroom settings after targeted training and support for learners' interaction skills.
Communication book	A communication book was successfully used in combination with the peer-mediated approach [7]. Similarly, the frequency of use of spontaneous communication book applications was used to assess other educational approaches (the milieu approach) [5].
Milieu approach	Hamilton and Snell (1993) [5] showed that the frequency of spontaneous communication increased once training began and continued to improve during training. Initially, some problematic behaviors occurred but were not consistent. The measured skills were retained 1 year after implementation. Similarly, the interim report (Saint-Georges et al., 2020; Tanet et al., 2020; 2016) [15] indicated increased communication skills, but there was no significant difference in comparison with the control group. However, the experimental group significantly enhanced their school skills (incl. language) after proceeding the milieu approach of sequenced learning.
Time delay and visual cues	In Matson et al.'s (1993) research [8], visual cue fading was compared with time delay. Both approaches were reported to increase participants' self-initiated verbalizations. The visual cue procedure was as effective as time delay, as no differences regarding achievements or maintenance were noted.
Electronic tools, iPad, or SGD	Hart and Whalon (2012) [6] reported positive treatment effects from video self-modeling using the iPad. Participants' correct unprompted academic responses increased. The findings indicated that teacher proficiency mediated learners' communicative outcomes. McMillan (2008) [9] reported increased unprompted responding through SGD use, but, as the device was used to measure the effect of a professional development package, the effect did not solely reflect use of the unit.
FCT	O'Neill and Sweetland-Baker (2001) [10] found that learners initially showed increased disruptive behavior after introduction of FCT, as this enabled learners to ask for a break. However, the target behavior decreased after a period of training. The assumed cause was teachers' uncertainty when confronting learners imagined to be large or aggressive.
TEACCH	Panerai et al. (1998) [11] measured improvement in learners' communication skills through implementation of the TEACCH approach. The treatment effect persisted 18 months after implementation.
Writers' workshop	Sturm (2012) [14] used the customized Enriched Writers' Workshop tool. This enabled learners with pervasive development disorders to join a complex learning situation. The approach increased learners' prerequisite skills for communication.

Note: SGD = speech-generating device; FCT = functional communication training; TEACCH = Treatment and Education of Autistic and Related Communication Handicapped Children.

Communication Skill Outcomes

After categorizing the educational approaches used in the articles, the effects of these approaches on the development of communication skills were analyzed. Table 4 shows the *reported effects on communication skills for each approach.* (Please see table 4 in the supplemental material, available at [*URL inserted by publisher*]).

Predominant Theories and Methods Used

Theoretical Assumptions

Most included studies did not focus on the theoretical perspective used. However, the theoretical perspective was directly or indirectly identified in 11 articles [2, 3, 4, 6, 7, 8, 10, 12, 13, 14, 15]. These theoretical perspectives were applied behavior analysis [4, 6, 7, 8, 10, 13, 15], social concepts (e.g., "all behaviors are acknowledged as having potential for interaction") [2 and 12], and theories about intensive interaction linked to infant–mother interaction [3]. Two studies [7, 15] identified behavioral perspectives and other perspectives. One study [7] inferred sociological theory through stigma reversal; the study identified the benefit of involving peers, as this removed the "humiliation" of having an adult paraprofessional assist in a general education class. One study seemed to refer to sociocultural perspectives [15], as the zone of proximal development was mentioned. Finally, one article (Sturm, 2012) demonstrated a connection to social interaction theory [14]: "Writing thus allows individuals to engage in authentic communication with themselves and others" (p. 336).

Methodological Designs

The majority of the studies used a single-case design. The range of sample sizes varied; some studies had relatively large samples, such as 38 learners [15] and 48 educators [7]. Other articles used case studies [1, 3, and 14] involving one or a few participants. The age of the samples was rather high; seven studies focused on adolescent learners (aged 13–21 years), and just one focused on preschool learners (≤6 years). Observations were sometimes used to evaluate the outcomes of the educational interventions. Multimethodological approaches were used to ensure validity and to capture various perspectives; these are shown in Table 5. (Please see table 5 in the supplemental material, available at [*URL inserted by publisher*]). Video or sound recording devices were the most common data collection methods used [2, 3, 4, 6, 7, 8, 10, 12, and 13]. Interviews were conducted to complement or validate collected data [1, 6, 7, 12, 13, and 15]. The quality appraisal in one article [15] stood out, as it included a control group, and the results were followed up two and three years after the first intervention. Fourteen studies were prospective and measured results from cause to effect. One study [3] was retrospective as it measured the opposite (effect to cause).

Research Gaps

Finally, research gaps in this field (regarding participants, theories, and methods) were identified to answer the third RQ. Most studies used baseline values of the measured behavioral data to analyze behavioral changes resulting from the approaches implemented. The limited number of articles identified in the databases demonstrate a general gap in research on educational approaches to enhance communicative skills among individuals with comorbid ASD and ID and a specific gap in evidence-based intervention. The research gap considered here corresponds with Catherine Saint-Georges et al. (2020), who state that before their sequenced one-to-one intervention proceeded, evidence-based educational approaches for individuals within ASD have mainly been assessed without including individuals with ID.

The use of prospective and retrospective research approaches was also examined. Most studies were prospective and assessed the effects of specific approaches. One study was retrospective and analyzed the circumstances that caused the outcome studied. Systematic analysis of included

Table 5. Multimethodological Approaches.

Article	Participants	Age (years)	Geographical area	Research methods, data collection used (if defined, duration)	Unit of analysis (Qual/Quant/Mixed)	Prospective or retrospective
1	3 Children	16, 17, 18	Illinois, USA	Case study Classroom observations, notes and sketches, interviews with teachers and family. (4 weeks)	Descriptive statistics of calculated nouns and verbs, and the ability to describe using speech or signs. Interpretation of parents' and educators' statements. (Mixed)	Prospective
2	3 Children, Staff	Not mentioned	Australia	Multiple baseline Video records, pre- and post-baseline. (30 weeks)	Learners' joint focus, baseline pre- and post-intervention. (Quant.)	Prospective
3	2 Children	Not mentioned	UK	Case study Case studies partly through video observation.	Learners' engagement was measured by observations of eye contact. (Qual.)	Retrospective
4	1 Child 2 Peers	15 (peers' age not mentioned)	Texas, USA	Multiple baseline Video recordings, analyzed using interrater reliability to ensure agreement in communicative behaviors.	Collected occurrence of communicative behaviors. Compared data from sessions with trained vs. untrained peers. (Quant.)	Prospective
5	1 Child	15	Canada	Multiprobe baseline The program offered approx. 20 opportunities of instruction, with prompts, gradually fading. (12 months)	Notified appropriate response, according to four prompt scales of increased assistance. (Quant.)	Prospective
6	1 Child	16	Florida, USA	ABAB reversal design Collected data using video and interviews. 20 sessions. (5 weeks)	A correct response was inferred if it was related to the educational content. (Quant.)	Prospective
7	5 Children 48 Peers	16, 17, 19, 20, 21 (age not mentioned)	Tennessee, USA	Multiple baseline Data were collected using videos in three inclusive school settings for each participant. Post-intervention interviews with educational peers. (Followed-up after 4–6 months.)	The frequency of communication book use defined how the approach affected learners' responses and initiations. (Quant.)	Prospective
8	3 Children	4, 4, 5	Louisiana, USA	Multiple baseline Data were collected using videos at 20-min sessions four times a week.	Accurate response occurred when the participant said the target phrase within 10 s of presentation. (Quant.)	Prospective
9	4 Children 4 Teachers	8–12 30, 57, 27, 49	Australia	Multiple baseline The frequency of learners' device responses was quantified.	The frequency of learners' independent vs. dependent device initiations and responses assessed the effectiveness of	Prospective

(*Continued*)

Table 5. Continued.

Article	Participants	Age (years)	Geographical area	Research methods, data collection used (if defined, duration)	Unit of analysis (Qual/Quant/Mixed)	Prospective or retrospective
					the approach. (Quant.)	
10	2 Children	6 and 15	Utah, USA	Multiple baseline Data were collected live or by videotape. Students participated in a series of 10-min sessions	The frequencies of disruptive behavior and/or break requests assessed the approach's effect on the learners. (Quant.)	Prospective
11	18 Children	Mean age 14	Italy	Multiple probe Multidimensional assessments, surveys, and structured observations. Evaluations before treatment vs. 12 and 18 months after.	The effect was evaluated using observations of inadequate behaviors vs. unprompted communications. (Quant.)	Prospective
12	1 Child 4 Class team members	8	North Carolina, USA	Simple AB design Video recordings of teacher–student interactions during routine activities, analyzed in 5–10 s segments. Follow-up interview with team members.	Efficacy was assessed by frequency of measured response sensitivity. (Quant.)	Prospective
13	3 Children 6 Peers	13, 13, 14 11–13	Ohio, USA	Multiple probe Intervention in general education classroom, and generalization settings. Recorded observations and interviews with peers.	Efficacy of peer-supported arrangements was analyzed by measuring frequency of learners' interactions. (Quant.)	Prospective
14	3 Children	8, 10, 13	Michigan, USA	Case study Pilot implementation in special education classroom. Case studies, measurement of quality and quantity of use of words, themes, and sentences.	Evaluated learners' individual goals against achieved outcomes (e.g., measured frequency and independence of letter use). (Mixed methods)	Prospective
15	38 Children 37 Children as controls	5–9	France	Multiple probe 36-month randomized controlled trial. The participants followed a program that combined modified TEACCH, positive reinforcement, and change of activity/ teacher every 10–15 min. Statistical analyses were performed.	Measured learners' ability to keep their attention on the object of learning. (Quant.)	Prospective

Note: The table describes and categorizes the participant groups, educational approaches, and researchers' perspectives on the measured outcomes. TEACCH = Treatment and Education of Autistic and Related Communication Handicapped Children.

articles revealed a specific pattern regardless of educational approach implemented or educators: team members' or peers' performance played an important role in enhancing learning in children. However, there was a lack of retrospective analyses of the role of special educational needs teachers.

Although the present findings indicate that educators' performance is crucial, none of the studies featured participating teachers who were actively engaged in the research process. Thus, there is a lack of research on collaborative approaches that help teachers.

Discussion

The included studies reflect the diversity of educational approaches used to enhance communication skills. Structured and well-defined interventions appeared to have a positive impact on outcomes for learners with ASD and comorbid ID. This systematic review combined findings from quantitative and qualitative studies, which may prompt questions regarding the equality of systematized data from the studies. For example, findings from a qualitative case study (Sturm, 2012) cannot be fully compared with quantitative longitudinal results (e.g., Panerai et al., 1998; Saint-Georges et al., 2020; Tanet et al., 2016, 2020). Additionally, it was interesting that the study that presented the most reliable design to make statements about the results of their intervention, appeared to present comparatively low, but accurate results. Even if the learners' communication skills did not distinctly increase in this study (Saint-Georges et al., 2020; Tanet et al., 2016, 2020) their ability to keep attention in the educational encounter was improved. There is also a potential issue of consensus regarding the assessed effect on learners' communication skills. For example, Payne et al. (1995) did not clearly state the outcome of learners' communication skills, as only educators' outcomes were specifically measured. However, these findings (Payne et al., 1995) should be included, given the importance of using others' gestures to be able to recognize the children's responses and attitudes, thereby enabling children's *voice* (United Nations Commission on Human Rights, 1989) and similarly their *property* in the community (Mead, 1934). Improvements in team members' responsiveness may increase opportunities for learners to communicate, as team members' responsiveness and learners' expressions are closely linked. This resonates with the concept of communication partners (Alwell & Cobb, 2009), which describes how both learner and communication partner need to succeed to make communication viable. By definition, children and youth with ASD and comorbid ID (APA, 2013; Schalock et al., 2010) experience a spectrum of communication needs. This systematic review found that awareness and responsiveness among educators, peers, and paraprofessionals are crucial for enhancing learners' ability to use linguistic (prompts, gesture) and physical tools (visual cue, VSM, iPad), but it also identified the limitations of research in this field.

The results of this study should be interpreted in the light of several limitations. The age limit was set at 21 years to avoid excluding individuals between childhood and adulthood. The use of a larger age range risked including studies of individuals categorized as adults. This review focused on children with ASD and comorbid ID, and it is possible that the inclusion criterion for ASD and comorbid ID unnecessarily narrowed the search. A criterion such as extensive communication difficulties could have been used instead. The narrow search resulted in a disparate set of articles. Following the PRISMA guidelines for systematic reviews (Page et al., 2021) and Hart's (2018) definition of integrative systematic reviews, the proceeding of the selection process could be found as a limitation in the present synthesis, whereas this model does not follow the traditional way of conducting systematic reviews—focusing randomized controlled trials, and experimental studies. Synthesizing evidence contained in the included articles was challenging due to the heterogeneity of the interventions. For example, few studies compared the outcomes for those who had received an intervention with those who had not. However, it is likely that these varied findings reflect the diverse classrooms and learning environments of learners with this combination of disabilities. In addition to these limitations, the present research adds important insights that are relevant for educators working with a similar group of students. It is hoped that these findings will stimulate further translational efforts between systematic research and leading practices in classroom supporting individuals with ASD and comorbid ID.

Conclusions

The association between educational approaches and resultant communication skills can be summarized as follows:

- Structured and well-defined interventions appear to have a positive impact on outcomes for learners with ASD and comorbid ID. However, the findings indicate that interventions for learners with ASD and comorbid ID should be implemented in similar environments to those in which the communication skills are needed.
- The main research methods used traversed structured observations using behavioral data baselines versus more intuitive, descriptively evaluated data. Because of the variety of study designs used, the quality of evidence in the included studies varied (e.g., presence/absence of a control group).
- Educators' awareness or the achievements of other personnel affect learners' communication skills, as learners' communicative attempts are linked to educators' responsiveness.

Future Research

The findings indicate that, regardless of the approach used, educators' prerequisite skills to adjust and respond to learners' actions play a central role in teaching. Therefore, more attention should be paid both to the professional development of educational praxis and to further strategic research in this area. Mead's (1934) theoretical account of speech and gesture may be useful in expanding interpretations of children's internal and external responses. Furthermore, Vygotsky's (2001) learning approach, in which children are supported by educators and use linguistic and physical tools, may be useful in promoting language and thought in children. As the target participants (individuals with ASD and comorbid ID) are a heterogeneous population, additional studies of participants with the same behavior or problem are needed to more precisely predict and actualize their abilities. A search for common variables in a group of persons with the same identified problem could identify factors that are important in changing their responses. The prospective studies critiqued in this review reported results typical for the study participants, but it is difficult to generalize these findings to other individuals.

Several of the included articles put the lens on the fact that teachers sometimes lack understanding of learners with ASD and comorbid ID. Thus, there is a pressing need for process approaches that enable teachers to listen to the voices of children with comorbid ID and ASD. Such approaches would ideally feature rigorously measured baseline data and interrater validity checks for quality assessment, as well as recognizing the complex communication ecology of each child. It is the hope of this author that such careful research can be implemented and reported on in the near future.

Disclosure Statement

No potential conflict of interest was reported by the author(s).

Funding

This study is part of a research project approved by the Swedish Ethical Review Board (2019-02767). Our work was founded by grant number 2017–06039 from the Swedish Research Council [Vetenskapsrådet]. I extend my sincere thanks to my supervising professors: Mona Holmqvist at Malmö University (Sweden) and Jonas Aspelin at Kristianstad University (Sweden).

ORCID

Kamilla Klefbeck http://orcid.org/0000-0002-0119-5490

References

*References marked with an asterisk indicate studies included in this systematic review.

Alwell, M., & Cobb, B. (2009). Social and communicative interventions and transition outcomes for youth with disabilities: A systematic review. *Career Development for Exceptional Individuals*, *32*(2), 94–107. https://doi.org/10.1177/0885728809336657

American Psychiatric Association (APA). (2013). *Diagnostic and statistical manual of mental disorders: DSM-5*.

*Baker-Ramos, L. K. (2017). Gesture and signing in support of expressive language development. *Inquiry in Education*, *9*(2), 2.

*Barber, M. (2008). Using intensive interaction to add to the palette of interactive possibilities in teacher–pupil communication. *European Journal of Special Needs Education*, *23*(4), 393–402. https://doi.org/10.1080/08856250802387380

Bellini, S., & Akullian, J. (2007). A meta-analysis of video modeling and video self-modeling interventions for children and adolescents with autism spectrum disorders. *Exceptional Children*, *73*(3), 264–287. https://doi.org/10.1177/001440290707300301

Biederman, G. B., & Freedman, B. (2007). Modeling skills, signs and lettering for children with Down syndrome, autism and other severe developmental delays by video instruction in classroom setting. *Journal of Early and Intensive Behavior Intervention*, *4*(4), 736–743. https://doi.org/10.1037/h0100403

Browder, D. M., Gibbs, S., Ahlgrim-Delzell, L., Courtade, G. R., Mraz, M., & Flowers, C. (2009). Literacy for students with severe developmental disabilities: What should we teach and what should we hope to achieve? *Remedial and Special Education*, *30*(5), 269–282. https://doi.org/10.1177/0741932508315054

*Caldwell, P. (2013). Intensive interaction: Using body language to communicate. *Journal on Developmental Disabilities*, *19*(1), 33–39.

Croucher, K., Quilgars, D., Wallace, A., Baldwin, S., & Mather, L. (2003). *Paying the mortgage? A systematic literature review of safety nets for homeowners*. Department of Social Policy and Social Work, University of York.

De Rivera, C. (2008). The use of intensive behavioural intervention for children with autism. *Journal on Developmental Disabilities*, *14*(2), 1.

Durand, V. M., & Merges, E. (2001). Functional communication training: A contemporary behavior analytic intervention for problem behaviors. *Focus on Autism and Other Developmental Disabilities*, *16*(2), 110–119. https://doi.org/10.1177/108835760101600207

Feiler, A., & Watson, D. (2011). Involving children with learning and communication difficulties: The perspectives of teachers, speech and language therapists and teaching assistants. *British Journal of Learning Disabilities*, *39*(2), 113–120. https://doi.org/10.1111/j.1468-3156.2010.00626.x

*Ganz, J. B., Heath, A. K., Lund, E. M., Camargo, S. P., Rispoli, M. J., Boles, M., & Plaisance, L. (2012). Effects of peer-mediated implementation of visual scripts in middle school. *Behavior Modification*, *36*(3), 378–398. https://doi.org/10.1177/0145445512442214

Ganz, J. B., Katsiyannis, A., & Morin, K. L. (2018). Facilitated communication: The resurgence of a disproven treatment for individuals with autism. *Intervention in School and Clinic*, *54*(1), 52–56. https://doi.org/10.1177/1053451217692564

*Hamilton, B., & Snell, M. (1993). Using the milieu approach to increase spontaneous communication book use across environments by an adolescent with autism. *Augmentative and Alternative Communication*, *9*(4), 259–272. https://doi.org/10.1080/07434619312331276681

Hart, C. (2018). *Doing a literature review: Releasing the research imagination* (2nd ed.). SAGE Publications.

*Hart, J. E., & Whalon, K. J. (2012). Using video self-modeling via iPads to increase academic responding of an adolescent with autism spectrum disorder and intellectual disability. *Education and Training in Autism and Developmental Disabilities*, *47*(4), 438–446.

Hart, S. L., & Banda, D. R. (2010). Picture exchange communication system with individuals with developmental disabilities: A meta-analysis of single subject studies. *Remedial and Special Education*, *31*(6), 476–488. https://doi.org/10.1177/0741932509338354

Hedegaard-Sørensen, L. (2017). Tværprofessionelt samarbejde om specialdidaktiske problemstillinger [Interprofessional collaboration on special didactic issues]. In H. Borgbjerg Hansen & B. Deng Mårtensson (Eds.), *Specialdidaktik I Teori Og Praksis* [Special didactics in theory and practice] (pp. 311–324). Hans Reitzels Forlag.

*Hughes, C., Golas, M., Cosgriff, J., Brigham, N., Edwards, C., & Cashen, K. (2011). Effects of a social skills intervention among high school students with intellectual disabilities and autism and their general education peers. *Research and Practice for Persons with Severe Disabilities*, *36*(1–2), 46–61. https://doi.org/10.2511/rpsd.36.1-2.46

Hume, K., Steinbrenner, J. R., Odom, S. L., Morin, K. L., Nowell, S. W., Tomaszewski, B., Szendrey, S., McIntyre, N. S., Yücesoy-Özkan, S., & Savage, M. N. (2021). Evidence-based practices for children, youth, and young adults with autism: Third generation review. *Journal of Autism and Developmental Disorders*. https://doi.org/10.1007/s10803-020-04844-2

Kaiser, A. P., & Roberts, M. Y. (2011). Advances in early communication and language intervention. *Journal of Early Intervention*, *33*(4), 298–309. https://doi.org/10.1177/1053815111429968

Keen, D., Sigafoos, J., & Woodyatt, G. (2001). Replacing prelinguistic behaviors with functional communication. *Journal of Autism and Developmental Disorders*, *31*(4), 385–398. https://doi.org/10.1023/A:1010612618969

Keen, D., Sigafoos, J., & Woodyatt, G. (2005). Teacher responses to the communicative attempts of children with autism. *Journal of Developmental and Physical Disabilities*, *17*(1), 19–33. https://doi.org/10.1007/s10882-005-2198-5

Koyama, T., & Wang, H. T. (2011). Use of activity schedule to promote independent performance of individuals with autism and other intellectual disabilities: A review. *Research in Developmental Disabilities*, *32*(6), 2235–2242. https://doi.org/10.1016/j.ridd.2011.05.003

Light, J., & Drager, K. (2007). AAC technologies for young children with complex communication needs: State of the science and future research directions. *Augmentative and Alternative Communication*, *23*(3), 204–216. https://doi.org/10.1080/07434610701553635

Maenner, M. J., Shaw, K. A., Baio, J., Washington, A., DiRienzo, P. M., Christensen, D. L., Wiggins, L. D., Pettygrove, S., Andrews, J. G., Lopez, M., Hudson, A., Baroud, T., Schwenk, Y., White, T., Rosenberg, C. R., Lee, L.-C., Harrington, R. A., Huston, M., Hewitt, A., … Dietz, P. M. (2020). Prevalence of autism spectrum disorder among children aged 8 years—autism and developmental disabilities monitoring network, 11 sites, United States, 2016. *MMWR Surveillance Summaries*, *69*(4), 1–12. https://doi.org/10.15585/mmwr.ss6904a1

*Matson, J. L., Sevin, J. A., Box, M. L., Francis, K. L., & Sevin, B. M. (1993). An evaluation of two methods for increasing self-initiated verbalizations in autistic children. *Journal of Applied Behavior Analysis*, *26*(3), 389–398. https://doi.org/10.1901/jaba.1993.26-389

*McMillan, J. (2008). Teachers make it happen: From professional development to integration of augmentative and alternative communication technologies in the classroom. *Australasian Journal of Special Education*, *32*(2), 199–211. https://doi.org/10.1017/S1030011200025859

Mead, G. H. (1934). *Mind, self, and society from the standpoint of a social behaviorist*. University of Chicago Press.

Nichols, T. R. (2015). Critically reading and understanding published research: Understanding retrospective and prospective studies. *World Council of Enterostomal Therapists Journal*, *35*(4), 42–44. http://search.ebscohost.com.ezproxy.hkr.se/login.aspx?direct=true&db=ccm&AN=114074510&lang=sv&site=ehost-live

*O'Neill, R. E., & Sweetland-Baker, M. (2001). Brief report: An assessment of stimulus generalization and contingency effects in functional communication training with two students with autism. *Journal of Autism and Developmental Disorders*, *31*(2), 235–240. https://doi.org/10.1023/a:1010711518182

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., … Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *International Journal of Surgery*, *88*, 105906. https://doi.org/10.1016/j.ijsu.2021.105906

*Panerai, S., Ferrante, L., Caputo, V., & Impellizzeri, C. (1998). Use of structured teaching for treatment of children with autism and severe and profound mental retardation. *Education and Training in Mental Retardation and Developmental Disabilities*, *33*(4), 367–374. http://www.jstor.org/stable/23879460

*Payne, H. W., Ogletree, B. T., & Simpson, R. L. (1995). Training team members to respond to the communicative behaviors of children with profound handicaps. *Focus on Autistic Behavior*, *10*(5), 1–15. https://doi.org/10.1177/108835769501000501

Qi, C. H., Barton, E. E., Collier, M., Lin, Y. L., & Montoya, C. (2018). A systematic review of effects of social stories interventions for individuals with autism spectrum disorder. *Focus on Autism and Other Developmental Disabilities*, *33*(1), 25–34. https://doi.org/10.1177/1088357615113516

Rumrill, P. D., Cook, B. G., Jr., & Wiley, A. L. (2011). *Research in special education: Designs, methods, and applications*. Charles C. Thomas Publisher Ltd.

*Saint-Georges, C., Pagnier, M., Ghattassi, Z., Hubert-Barthelemy, A., Tanet, A., Clément, M.-N., Soumille, F., Crespin, G. C., Pellerin, H., & Cohen, D. (2020). A developmental and sequenced one-to-one educational intervention (DS1-EI) for autism spectrum disorder and intellectual disability: A three-year randomized, single-blind controlled trial. *EClinicalMedicine*, *26*, 100537. https://doi.org/10.1016/j.eclinm.2020.100537

*Schaefer, J. M., Cannella-Malone, H., & Brock, M. E. (2018). Effects of peer support arrangements across instructional formats and environments for students with severe disabilities. *Remedial and Special Education*, *39*(1), 3–14. https://doi.org/10.1177/0741932517727865

Schalock, R. L., Borthwick-Duffy, S. A., Bradley, V. J., Buntinx, W. H., Coulter, D. L., Craig, E. M., Gomez, S. C., Lachapelle, Y., Luckasson, R., Reeve, A., Shogren, K. A., Snell, M. E., Spreat, S., Tasse, M. J., Thompson, J. R.,

Verdugo-Alonso, M. A., Wehmeyer, M. L., Yeager, M. H. (2010). *Intellectual disability: Definition, classification, and systems of supports*. American Association on Intellectual and Developmental Disabilities.

*Sturm, J. M. (2012). An enriched writers' workshop for beginning writers with developmental disabilities. *Topics in Language Disorders*, *32*(4), 335–360. https://doi.org/10.1097/TLD.0b013e318272609b

*Tanet, A., Hubert-Barthelemy, A., Clément, M.-N., Soumille, F., Crespin, G. C., Pellerin, H., Allaert, F.-A., Cohen, D., & Saint-Georges, C. (2020). Developmental and sequenced one-to-one educational intervention (DS1-EI) for autism spectrum disorder and intellectual disability: A two-year interim report of a randomized single-blind multicenter controlled trial. *BMC Pediatrics*, *20*(1), 263. https://doi.org/10.1186/s12887-020-02156-z

*Tanet, A., Hubert-Barthelemy, A., Crespin, G. C., Bodeau, N., Cohen, D., Saint-Georges, C., & GPIS Study Group. (2016). A developmental and sequenced one-to-one educational intervention for autism spectrum disorder: A randomized single-blind controlled trial. *Frontiers in Pediatrics*, *4*, 99. https://doi.org/10.3389/fped.2016.00099

United Nations Commission on Human Rights. (1989). *Convention on the rights of the child: Text of the draft convention as adopted by the Working Group at second reading*. United Nations.

Vygotsky, L. S. (2001). *Tänkande och språk* [Thought and language]. Daidalos.

Wong, C., Odom, S. L., Hume, K. A., Cox, A. W., Fettig, A., Kucharczyk, S., Brock, M. E., Plavnick, J. B., Fleury, V. P., & Schultz, T. R. (2015). Evidence-based practices for children, youth, and young adults with autism spectrum disorder: A comprehensive review. *Journal of Autism and Developmental Disorders*, *45*(7), 1951–1966. https://doi.org/10.1007/s10803-014-2351-z