

RESEARCH

Interactive shared reading case study of a student with complex support needs

Journal of the American Academy
of Special Education Professionals
2026, Vol. 21(1) 59 - 83
© JAASEP 2026
DOI: 10.64546/jaasep.599



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Abstract

Shared reading approaches with school-aged students who have complex support needs (CSN) and complex communication needs (CCN) typically focus on increasing the rate and accuracy of student responses to adult prompts and questions. This descriptive mixed method case study focused on the implementation of a shared reading approach designed to increase the engagement and expressive communication of a student with CSN and CCN. Increases in the teacher's use of interactive strategies and demonstration of augmentative and alternative communication (AAC) occurred concurrently with increases in student engagement, initiations, and expressive symbolic communication. Implications for teacher practice and teacher preparation programs are discussed.

Keywords: shared reading, complex support needs, AAC, initiation, communication

There are unique challenges when providing emergent literacy instruction to students with complex support needs (CSN). These students have intellectual disabilities that require extensive, repeated, and individualized instruction for learning and generalizing literacy and communication skills (Erickson, 2013; Kleinert et al., 2009). Students with CSN often present with motor and/or sensory difficulties, speech and language challenges, and low levels of engagement (Burnes & Clark, 2021; Kurth et al., 2016). Burnes and Clark (2021) reported students with CSN and CCN struggle with initiating and developing spontaneous communication. Furthermore, these authors noted approximately half are unable to respond to simple requests and approximately one-third are unable to use words, signs, or graphic symbols. Just over one-third of students with CSN are unable to use speech to meet their face-to-face communication needs and are thereby considered to have complex communication needs (CCN; Erickson & Geist, 2016). These complex educational profiles make it challenging for students with CSN and CCN to participate in activities like shared reading.

Shared Reading

According to a social-constructivist developmental model (Vygotsky, 1978),

language and literacy are acquired through socially engaged interactions with more knowledgeable others. Consistent with this, the socially constructed exchange with a reading partner is a critical component of shared reading. During shared reading, adults read aloud while encouraging student engagement and interaction (Erickson & Koppenhaver, 2020; Ezell & Justice, 2005). Various forms of shared reading have been used successfully with children with and without disabilities (U.S. Department of Education, 2015), including elementary students with CSN and CCN (Boyle et al., 2019; Hudson & Test, 2011; Toews et al., 2021). However, the communication, attention, and cognitive profiles of children with CSN and CCN (Burnes & Clark, 2021) can make it challenging to implement shared reading with a social and communicative focus.

The Interactive-to-Independent Literacy Model

The interactive-to-independent literacy model (Kaderavek & Rabidoux, 2004) is based on a social-constructivist approach. This model provides a five-component developmental framework for building increased independence for students with severe disabilities during literacy interactions. The first two components target skills that are applicable to beginning communicators during shared reading. In the first component, students are supported in their engagement, including their attention and responsiveness. In the second component, students are supported in learning to communicate to initiate, request, describe, and respond. The long-term goal is to create a more equal exchange between the student and the adult reading partner. The next three components align with more advanced communication. They focus on developing symbolic understanding of written forms, conventional literacy supported by social interactions, and conventional literacy at an independent level.

The first component of the interactive-to-independent literacy model, student engagement, is difficult for many students with CSN during shared reading. Students with CSN are reported to have difficulty attending (Hudson & Browder, 2014), remaining responsive (Browder et al., 2008), and suppressing disruptive behaviors (e.g., pushing materials, screaming; Bock & Erickson, 2015). However, only a few studies have measured engagement of students with CSN during shared reading. Mucchetti (2013) used a shared reading approach designed to prompt specific responses to interaction (e.g., turning the page, answering questions) with students with CSN and CCN (i.e., students with autism who were minimally verbal). Student engagement (e.g., attending, interacting with materials, pointing, or verbalizing) increased from baseline to intervention and then remained high during intervention (i.e., 87% to 100%). Cheek and colleagues (2022) examined attention to text during shared reading for three students with CSN and CCN. This study used an approach to shared reading that invited interaction without requiring the students to demonstrate specific targeted responses. Two students demonstrated increased attention to text. One student decreased attention to text, but this represented a positive change as the student increased their use of symbolic communication (i.e., commenting and responding). This required shared attention between the book, the adult, and the student's AAC system, which decreased attention to the text itself.

The second component of the interactive-to-independent literacy model focuses on multiple forms of interaction with students. Most often, studies with students who have CSN and CCN have used a system of least prompts and constant time delay to improve the rate and accuracy of targeted student

responses. For example, Browder et al. (2008) reported increased rates of a variety of targeted responses (e.g., making book choices, completing a repeated story line with a single message switch, attending to objects, and vocalizing, smiling or laughing in response to their own name). Other studies using similar approaches to shared reading have reported increased accuracy in targets focused on concepts of print, vocabulary, and responding to questions by selecting from arrays of two to four items (Mucchetti, 2013; Spooner et al., 2014). Only a few studies have used an interactive approach to shared reading focused on initiation and engagement rather than targeted responses. These interactive approaches included strategies such as following the students' lead, providing sufficient wait time to encourage student communication efforts, and using open-ended or topic-continuing questions (Erickson & Koppenhaver, 2020). The application of these types of strategies led children with CSN and CCN to increase their use of labeling, commenting, initiations, interactive communication, attention to text, spontaneous expressive communication, and level of symbolic communication (Cheek et al., 2022; Quick & Erickson, 2024; Skotko et al., 2004). More studies are needed on approaches to shared reading that target and support the development of a range of communication skills, as described in the interactive-to-independent model.

Augmentative and Alternative Communication During Shared Reading

Supporting students with CSN who have CCN requires augmentative and alternative communication (AAC), which includes aided (e.g., graphic or tactile symbols, dedicated communication devices, apps) and unaided forms (e.g., facial expressions, vocalizations, manual signs, gestures). Unfortunately, many students with CSN and CCN do not have

access to any aided AAC supports (Dorney et al., 2025; Ogletree & Pierce, 2010), more than a few graphic symbols (Erickson & Geist, 2016), or aided AAC in the classroom (Benson-Goldberg & Erickson, 2024; Bock & Erickson, 2015). Even when these students have access to aided AAC, they rarely use it to initiate and respond across contexts (Erickson & Geist, 2016) or receive instruction to learn to do so (Pennington et al., 2021). One evidence-based AAC intervention that addresses this dual challenge is aided language input (O'Neill et al., 2018), in which adults demonstrate the use of graphic symbols by pairing spoken words with pointing to the graphic symbols they represent. Aided language input also involves attributing meaning to students' unaided forms of communication and demonstrating symbolic equivalents using aided AAC (Dorney & Erickson, 2019; Erickson et al., 2021; Yoder et al., 1994). When provided aided language input in this way during shared reading, students have increased their use of aided AAC in ways that have carried over into other instructional contexts (Cheek et al., 2022; Quick & Erickson, 2024; Skotko et al., 2004).

In Cheek and colleagues (2022), one teacher completed online professional development (PD) and received eCoaching to support her shared reading with her students with CSN and CCN. She learned to implement interactive shared reading strategies with aided AAC using aided language input. Specifically, the teacher was taught to attribute meaning to all child communication attempts, encourage and demonstrate the use of aided AAC, provide wait time, and make comments or ask questions that maximized the use of story-specific vocabulary. The three elementary aged students increased communication initiations and responses as well as attention to text. In this study, increased access to aided AAC and the use of aided language input led to increased diversity of

communication skills as is the goal of the interactive-to-independent literacy model. In Quick and Erickson (2024), four classroom teachers completed professional development on same interactive approach implemented by Cheek and colleagues. The mixed group of thirteen students with and without CCN demonstrated a significant increase in the number of expressive communication skills they demonstrated and the highest level of symbolic communication they used.

Socially Engaged Instruction During Shared Reading

In the interactive-to-independent literacy model, socially engaged instruction is considered a critical component for student growth and development. As such, socially engaged shared reading instruction must (a) follow the students' lead, (b) provide sufficient wait time to encourage communication efforts, (d) include repetition and expansion of all student communication efforts, (d) offer numerous and varied demonstrations of comments, (e) use open-ended or topic-continuing questions, and (f) monitor student engagement (Erickson & Koppenhaver, 2020; Landry et al., 2017). When adults combine these strategies with aided AAC access and use, students with CSN and CCN are more likely to initiate their own comments and questions while also learning to respond (Cheek et al., 2022; Quick & Erickson, 2024; Skotko et al., 2004). This differs from shared reading interventions that combine direct requests and questions with the use of systematic prompting and time delay to teach targeted responses (Browder et al., 2008; Spooner et al., 2014) but often fail to teach students to initiate their own comments and questions (Boyle et al., 2019; Fleury & Schwartz, 2017).

The Tar Heel Shared Reader implementation model was developed to help teachers support engagement and interactive communication during

shared reading with their students who have CSN and CCN (<https://www.sharedreader.org>). The PD, coaching, and resource components of the model focus specifically on helping teachers learn to implement interactive, socially engaged approaches to shared reading to support student engagement, initiation, and interaction. The model features a strategy named, Follow the CAR. Based on an early language and literacy framework for young children (Cole et al., 2002), Follow the Car is focused on supporting students in learning to take the lead while targeting student language, literacy, and communication skills. The acronym in Follow the CAR represents three key elements: (1) Commenting and waiting, (2) Asking for participation and waiting, and (3) Responding by adding a little more. Adult comments are prioritized over questions to build student understanding and language skills (Justice et al., 2009). Adult responsivity to student interests and initiations is prioritized over directing the interaction to help students develop joint attention and communication skills (Barnes et al., 2017). Commenting with aided language input using aided AAC is prioritized over question- or task-specific answer arrays to support flexible, expressive use of aided AAC (Erickson et al., 2021; Yoder et al., 1994). These forms of adult scaffolding support the development of engagement and interaction that align with the interactive-to-independent literacy model.

Purpose of the Study

Only two known studies (Cheek et al., 2022; Quick & Erickson, 2024) have investigated classroom shared reading practices that promote engagement and a range of interactive communication skills consistent with the interactive-to-independent literacy model (Kaderavek & Rabidoux, 2004) with students with CSN and CCN. A small body of literature suggests that shared reading structured to support interaction

may support a variety of skills associated with the engagement and communication needs of students with CSN and CCN (Bock & Erickson, 2015; Skotko et al., 2004); however, no known studies have measured student engagement, initiations, and use of aided AAC during interactive approaches to shared reading, while also measuring access to aided AAC and aided language input. This descriptive mixed method case study focused on a teacher who was working to implement the Tar Heel Shared Reader approach with a single student with CSN and CCN during small group instruction was designed to address this gap. Specifically, the study was designed to examine how teacher and student behaviors changed over an academic year as a special education teacher worked to learn and implement the Tar Heel Shared Reader model. The research questions addressed changes in teacher and student behaviors including: (a) the teacher's shared reading behaviors and use of aided language input; (b) the student's access to aided AAC; and (c) the student's engagement, initiations and responses, as well as the frequency or complexity of aided and unaided communication. Over the course of the academic year, it was predicted that there would be increases in teacher interactive behaviors, aided language input, student access to aided AAC, as well as student engagement, initiations, and communication.

Method

This study used a descriptive mixed method case study design (Yin, 2014). This design was selected because it is especially appropriate given exploratory questions that ask how and why. In the current study, the design supported an exploration of how and why teacher and student behaviors changed during interactive shared reading. Further, the mixed-methods component supported the need to draw on

multiple ways of knowing, examine unintended consequences, and provide deeper insight into the factors influenced the implementation and effectiveness (Love et al., 2022) of the shared reading intervention. It also supported the integration of multiple sources of quantitative and qualitative data that were collected to provide deeper understanding of the changes observed in teacher and student behaviors. The case study design also supported the in-depth investigation of interactive shared reading within the real-world context of the classroom, rather than in an experimentally controlled context (Hancock & Algozzine, 2017). This made the descriptive case studies especially valuable for examining social and communicative engagement for the purpose of informing future research (Arthur-Kelly et al., 2008; Yin, 2014). The specific case was selected because the teacher volunteered to learn about and implement the Tar Heel Shared Reader model with her student who was a beginning communicator with CSN and CCN. The two match the profiles of educators and students for whom the interactive-to-independent literacy model was developed.

Background Information

This study was part of a larger study approved by the human subjects review board at the university where the authors were employed and the rural school district in the southeastern U.S. where the study was conducted. After permission to conduct the larger study was secured from the school system and building principal, teachers in special education classrooms that serve students with CSN were recruited. Consenting teachers then passed along recruitment materials to the caregivers of students in their class with CSN who were aged 3 to 26 and not yet reading or listening with comprehension above the second-grade level.

Participants

The teacher and student in this study, were observed across the school year in a self-contained classroom for students with severe intellectual disabilities located in a public elementary school. The school served about 650 students in prek-5th grade who were all eligible for free and reduced lunch. Forty percent of the students were black/African American, 13% were Hispanic/Latino, and 7% had two or more races. Martha, the teacher, had been teaching special education for 15 years and self-reported an ethnicity of “other” and an age range of 35-44 years. At the beginning of the year, she reported that she felt confident in her ability to include literacy goals in her students’ Individual Education Programs (IEP) and that she regularly read books to her students. However, she felt unsure about her ability to use shared reading to: (a) support her students’ early literacy development; (b) engage her students; or (c) support her students’ communication using aided AAC.

Cody was a first-grade student aged 7 years, 9 months with severe intellectual disabilities who communicated using a combination of movements, vocalizations, and facial expressions. He received special education services under the IDEA category of developmental disability. He reportedly enjoyed socially engaging adults but struggled with attention during instruction. Cody used a manual wheelchair and accessed single message voice output devices with a fist-d hand. He could isolate and extend his right index finger but did not yet use it to access touch screens or other assistive devices. Cody’s IEP documented that he had a personal aided AAC device but showed no interest in it. Nevertheless, the IEP stipulated that “pictures and a low-tech communication board” were to be offered during instruction.

A Communication Matrix (Rowland, 2004) completed at the beginning of the year suggested that

Cody used a range of unconventional and conventional nonsymbolic behaviors for various purposes including: (a) refusing: turned his head to the side or shook his head; (b) obtaining: gazed between people and desired objects or nodded his head; (c) social interactions: waved to greet people, raised his hand to get attention, gazed back and forth between people, objects, or places; and (d) providing information: used head nods and shakes to answer yes or no questions.

Procedures

Approximately once a month, two members of the research team provided PD to Martha and 14 other special education teachers participating in the larger project. The PD was followed by classroom observations of shared reading by one member of the research team who also responded to any teacher questions or concerns. During these observations, the researcher took field notes, guided by self-reflection and observation forms aligned with different stages of the PD and overall model (<https://www.sharedreader.org/reflection-forms>).

Professional Development Sessions

The PD modules Martha completed included content and learning activities presented in a face-to-face setting, with content focused on the importance of interaction during shared reading, components of the Follow the CAR, use of a project-specific web-based reading interface (now <https://MonarchReader.com>), self-reflection as a critical component of instructional practice, and book selection for emergent readers. Additionally, the PD addressed the importance of providing students with access to personal aided AAC systems, attributing meaning, and providing aided language input (See Appendix A). The most recent versions of these PD modules can be freely accessed online in both self-directed and facilitated formats at

<https://www.sharedreader.org/professional-development/>.

Measures

Teacher Self-Assessment and Interviews.

At the beginning and end of the academic year, Martha completed a self-assessment (See Appendix B), which included eleven statements that asked her to reflect on her instructional practice using a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), as well as optional open-ended elaborations. The topic areas included: (a) inclusion of academic and literacy IEP goals; (b) experience using Tar Heel Reader (now Monarch Reader); (c) confidence in supporting early literacy skills, engaging students during shared reading, using technology, and supporting communication; (d) demonstrating use of AAC symbols; and (e) assessing engagement and interaction. Martha also participated in a 10- to 15-minute face-to-face semi-structured interview (see Appendix C) at the beginning and end of the year, with open-ended questions that probed the following areas: (a) understanding of shared reading, (b) engagement in shared reading, (c) decisions about books, (d) supporting students who are unable to use speech, and (e) challenges and successes with shared reading.

Classroom Observations of Shared

Reading. Shared reading sessions were videotaped in their entirety, with the camera angled to capture Martha, Cody, and the other students who had consent to participate in the larger study. Unconsented students were intentionally seated outside of the viewing area or edited out of the videos. Throughout, Martha self-selected hard copies of published books or e-books from the online library of books (i.e., Monarch Reader) which offered more than 68,000 accessible, open-source, easy-to-read books on a wide range of topics. Martha projected these

books on an interactive whiteboard.

Data Analysis

Teacher Self-Assessment and Interviews

Coding Procedures. The teacher self-assessment and interview from the beginning and end of the year were analyzed using deductive analysis in which data were organized into categories that were in alignment with the research questions (Bingham & Witkowsky, 2022). The first author began with data familiarization and then parsed the data into information-rich quotations and reflections, which composed the data set for analysis. The research questions regarding teacher and student behaviors provided the organizing framework for themes in the coding process.

Video Coding Procedures of Classroom

Observations. A time sampling procedure with partial interval recording was used to obtain a representative sample of Martha and Cody's behaviors in each shared reading session. This procedure has been used in studies of classroom engagement and communication with this population (Arthur-Kelly et al., 2008; Hunt et al., 1994). As four of the five sessions lasted approximately 10 minutes, it was decided to code the first 10 minutes of each video. Martha's and Cody's behaviors were coded in separate viewings, alternating between a 15-second interval for observing behaviors and a 15-second interval for recording observations of the previous interval. This alternating cycle resulted in a total of 20 coded intervals for Martha and Cody in each video.

Martha's use of behaviors from the Follow the CAR approach was coded three times. First, behaviors were coded for one of the mutually exclusive CAR elements: (a) commenting about the book, (b) asking for student participation, or (c) responding to student communication efforts. Then each CAR element was coded for complexity (i.e., single words, signs, or symbols; or multiple words,

signs, or symbols) and mode (i.e., verbal, verbal paired with sign, or verbal paired with graphic symbol). Each behavior coded as *asking for student participation* was further coded to indicate the teacher's use of (a) pausing, (b) repeating a comment with expectant look, (c) encouraging use of the aided AAC system with verbal or gestural indication, or (d) asking open-ended questions or questions with no right or wrong answer. Each behavior coded as *responding to student communication efforts* was further coded to indicate whether the teacher was (a) repeating or (b) expanding.

Student engagement codes were based on those developed by Hunt and colleagues (1994). They included: (a) *active*: actively participates by communicating through nonverbal, verbal, sign, or graphic symbols; (b) *passive*: demonstrates participation by attending to the book, teacher, or actively participating peer, and; (c) *not engaged*: demonstrates external behaviors that indicate lack of attention, disruptive behaviors that interfere with attending, or escape or avoidance behaviors. Student interaction codes were based on those developed by Staub and Hunt (1993). They included: (a) *initiation*: communicates in ways that share a new idea, change the topic, or suggest an action; or (b) *response*: uses follow-up comment, question, or nonverbal behavior after an initiation to continue the interaction. All student initiations and responses were coded as being *symbolic* (i.e., uses one or more words, signs, or symbols) or *nonsymbolic* (i.e., uses facial expressions, body movements, gestures, or vocalizations).

Cody's access to AAC was also noted for each shared reading session. If yes, a description of the aided AAC was recorded.

Interrater Agreement for Codes. Interrater agreement with the coding scheme was established between the first and second authors using shared

reading videos from another study. Cohen's kappa was calculated based on point-by-point comparisons of the two coders' coding across all variables, with a mean average of .86. For the present study, the first and second authors independently coded teacher and student behaviors in two randomly selected videos (33.3%), with a mean kappa score of .81. The remaining videos were simultaneously coded by both authors. Coders resolved all differences through discussion.

Data Analysis

Quantitative (i.e., behavioral coding from classroom observations and presence of access to aided AAC) and qualitative (i.e., teacher self-assessment and interviews) data were first analyzed independently. Quantitative data regarding teacher shared reading behaviors, access to aided AAC, and child interaction skills were analyzed using descriptive statistics. Descriptive statistics were used to provide a foundational summary of the child's communication behaviors and the teacher's shared reading behaviors.

Qualitative data included teacher self-assessment forms and interviews, which were analyzed using deductive analysis. These data provided rich descriptions of the teacher's experience, perceptions, and observations while implementing Follow the CAR in the natural context of the classroom. Specific to the research questions, data that addressed changes in the teacher's shared reading behaviors, the student's access to aided AAC, and the student's engagement and communication behaviors were coded and then examined relative to the guiding theory, the interactive-to-independent literacy model. The resulting themes were verified through triangulation and peer debriefing with the authors.

Triangulation of the qualitative data involved comparing results from teacher self-assessment

forms, teacher interviews, and videotaped classroom observations. Specifically, the sources of data were compared using pattern matching (Yin, 2014) with attention to both confirming and disconfirming data. Furthermore, the quantitative and qualitative data were compared across time points (Anney, 2014). The analysis examined whether the predicted changes in teacher behaviors resulted in subsequent increases in student engagement and interaction aligned with observed patterns in the data.

The qualitative and quantitative data were then integrated to provide a more complete understanding of the interactive approach to shared reading and its impact on the teacher and student. The observational data added to the qualitative data through additional descriptions of teacher self-reflections and observations of implementation of Follow the CAR in context. During the data interpretation stage, data were mixed with the qualitative data taking a secondary role to the quantitative data (Creswell & Clark, 2018). This mixed

data were then matched to propositions that aligned with the interactive-to-independent literacy model, intentionally looking for congruencies and discrepancies.

Results

Changes in Teacher Behaviors

The frequencies of Martha's use of each element of Follow the CAR across all five observed sessions are reported in Table 1. Overall, Martha increased in her total use of CAR Components from two to 44, with particularly large increases in her use of single and multiple symbol comments. Additionally, over the five sessions she increased the diversity of her communication modes from one to four. In the first session Martha only used verbal communication when implementing CAR components, but by the fifth session she used verbal, sign, graphic symbol, and non-linguistic modes when implementing CAR components.

Table 1 Within session frequency of teacher's use of CAR components and modes of communication

CAR Components	Session 1	Session 2	Session 3	Session 4	Session 5
Single symbol comments	0	8	1	7	11
Multiple symbol comments	0	11	2	16	2
Pause 5 seconds	0	0	1	1	5
Repeat comment	1	0	3	1	5
Open-ended question	0	0	1	2	1
Reference device	0	0	0	0	0
Repeat	1	4	13	5	8
Expand	0	7	22	13	12
Modes of Communication					
Verbal	2	24	37	33	27
Sign	0	6	3	7	4
Graphic Symbol	0	0	2	2	8
Non-linguistic (Pause 5 seconds)	0	0	1	1	5
Total CAR Components/Modes	2	30	42	43	39

In the interview at the beginning of the year, Martha reported limited self-confidence in providing socially engaged instruction. Martha said, “I don’t really know how to teach reading...[but] I’m willing to change and am open to whatever is best.” During the first observed session, she read the book without making any book-related comments or responding to student communication efforts. By the second session, after the first PD session, Martha used 19 book-related comments. She continued to use at least 13 comments in each of the remaining sessions except session 4 during. In session 4, she made only three comments but responded frequently to student communication efforts (i.e., 35 times). Martha began inviting the student to participate by the third and fourth session (i.e., 4-5 times) and then more than doubled this by the final session (i.e., 11 times). Martha most frequently invited participation by repeating book-related comments with an expectant look. Martha only responded to student communication efforts once in the first session but then used this strategy 11-35 times throughout sessions over the remainder of the year. These changes in Martha’s behaviors were also reflected in her self-assessment at the end of the study. Martha reported that she felt confident or very confident in her ability to use shared reading to: (a) support her students’ early literacy development; (b) engage her students; and (c) use technologies or support her students’ communication. During her final interview, Martha said, “It did take me a while because it’s not how we are taught to teach. In teaching, we have been taught that the focus is on comprehension. But in shared reading, the focus is on getting students engaged, getting them to communicate and honoring their communication and making sure each student has a way to communicate.”

Changes in Access to Communication Systems

and Language Models in AAC

Cody’s access to an aided AAC system and the format of the system changed across the observed sessions. During the first session, a single symbol with “turn the page” was laminated on the table in front of him, but no other symbols were available to enable him to communicate a range of ideas for a range of purposes. Martha also provided access to a device with a single message recording of a repetitive story line. For each of the remaining sessions, Cody had access to a set of 36 graphic symbols organized on printed, laminated displays; however, the organization differed in format across sessions. In all cases, the words were drawn from the Universal Core vocabulary (available for download at <https://www.project-core.com/>).

As reported earlier, Martha made no book-related comments during the first session and only responded to Cody’s communication once. As she expressed during her initial interview, “I don’t know that I work on communication. Communication is on the back burner to be honest.” During session 2, she began to pair individual manual signs with her comments a handful of times and continued to do so throughout the remaining sessions. She also began pairing graphic symbols with speech (i.e., aided language input) two times each during sessions 3 and 4, but by session 5, approximately 20% of her comments included pointing to graphic symbols. Thus, she increased her use of comments in the same modality as of her student (i.e., manual signs or graphic symbols) from 0% to 31%. Table 1 also displays data about the communication modes.

Changes in Student Engagement

The frequency and percentage of Cody’s engagement across sessions is displayed in Table 2. Overall, there was a steady increase in Cody’s active engagement over the course of the year, from nearly

0% to nearly 75% of coded intervals. In contrast, non-engagement decreased from 40% to 17% in the first

half of the year and then further decreased to 0% during the last half of the year.

Table 2 Within session frequency (percentage) of student engagement and communication behaviors

	Session 1	Session 2	Session 3	Session 4	Session 5
Engagement					
Active	4 (3%)	10 (56%)	14 (70%)	14 (70%)	15 (75%)
Passive	5 (33%)	5 (28%)	6 (30%)	6 (30%)	5 (25%)
Non-engaged	6 (40%)	3 (17%)	0 (0%)	0 (0%)	0 (0%)
Total Intervals*	15	18	20	20	20
Communication Behavior					
Initiations	0 (0%)	3 (25%)	10 (30%)	11 (39%)	17 (43%)
Responses	3 (100%)	9 (75%)	23 (70%)	17 (61%)	23 (58%)
Symbolic	0 (0%)	4 (33%)	19 (58%)	3 (11%)	5 (13%)
Nonsymbolic	3 (100%)	8 (67%)	14 (42%)	25 (89%)	35 (87%)
Total Behaviors	3	12	33	28	40

Note. *A total of 20 intervals were planned for coding. Non-coded intervals occurred when the student was blocked from view in the video.

Changes in Student Communication

Changes in Cody's communication behaviors across the five sessions are also displayed in Table 2. Overall, Cody showed consistent increases in his use of initiations, responses, and nonsymbolic communication behaviors. Specifically, Cody showed a steady increase in initiations from 0 to 17 from the first to the final session. He responded to adult communication fewer than 10 times during each session in the first half of the year, but during the second half he responded 17 to 23 times. At the beginning of the year, when Cody did not have access to a personal aided AAC system, none of his communication efforts were symbolic. Then the teacher collaborated with the building speech-language pathologist to provide aided AAC during instruction. During sessions 2-5, with comments modeled in AAC or manual signs and consistent access to aided AAC, Cody consistently used manual sign approximations or graphic symbols to

communicate. For example, during session 2, the teacher commented "It's so cold" while signing *cold*, and then Cody smiled and approximated the manual sign for *cold*. During session 5, the teacher commented, "She can look," while pointing to the graphic symbol LOOK on Cody's personal aided AAC system. Cody watched her, pointed to the symbol LOOK, and then smiled at Martha. Later Martha read, "My uncle is lazy." Cody touched the graphic symbol HELP multiple times. Martha asked, "Help? They don't help?" Cody touched the graphic symbol HELP again. The teaching assistant said, "They help. He's saying his uncles help."

Co-occurrence of Teacher Behaviors, AAC Access, and Student Behaviors

As Martha began using the Follow the CAR strategies, providing aided language input, and providing Cody with ongoing access to aided AAC, Cody's engagement increased from 60% of coded intervals in the first session, to 83.4% by the second

session, and then to 100% by session 3, where it remained throughout the rest of the sessions. No causation can be inferred from this descriptive case study. Yet, these changes across sessions suggest that the combination of teacher behaviors and increased access to aided AAC using this particular approach to shared reading may have supported Cody's increased engagement.

In addition to changes in level of engagement, Martha's increased use of interactive strategies while providing Cody with access to aided AAC co-occurred with increases in Cody's communication efforts. Cody's IEP specifically noted his previous lack of progress in communication and limited interest in aided AAC. During the first session, Martha focused on reading the book with animation, but she did not use aided language input and did not provide Cody with access to aided AAC. Thus, Cody was primarily a passive observer, only responding three times to direct requests. By the second session, Cody had access to an aided AAC system. Additionally, Martha frequently used all elements of Follow the CAR and Cody was observed initiating communication three times, responding to Martha's direct requests nine times, and communicating symbolically four times. Over the remaining three sessions, Martha's use of all elements of Follow the CAR and aided language input increased, as did the frequency of Cody's communication efforts. Of note, Cody steadily increased the number of initiations from three to 17 across the shared reading sessions.

Discussion

According to the interactive-to-independent literacy model, addressing the emergent literacy learning needs of students with CSN and CCN through shared reading requires a focus on engagement and interaction (Kaderavek & Rabidoux, 2004). Shared reading approaches that include strategies such as

task analysis, constant time delay, and prompting systems can increase the rate of correct responses; however, they may also result in students assuming a passive role (Bock & Erickson, 2015) and rarely initiating (Fleury & Schwartz, 2017) or engaging in multiple turn interactions.

The design of the current study makes it impossible to establish a causal connection between changes in teacher behaviors or access to AAC and student outcomes. However, there is no question that there were meaningful changes in teacher behaviors that are reported to facilitate engagement and interaction (e.g., Barnes et al., 2017; Erickson, Geist et al. 2021). There were also meaningful increases in Cody's engagement and communication, despite a history of limited growth and ownership of an aided AAC device prior to this project. This improvement is notable, given that little to no change in communication skills is reported among many students with CSN and CCN over the whole of their educational career (Erickson & Geist, 2016).

At the beginning of the year, Martha's shared reading practice was limited to reading aloud and allowing students to touch the book or activate a single message voice output device. Such a device might increase participation (Skotko et al., 2004) but is insufficient for supporting the full range of interaction required to foster flexible language learning (Light & McNaughton, 2020). While Martha initially engaged her students by using an animated voice and gestures, she did not facilitate student interaction or engagement with the text, illustrations, or her. Thus, Cody's communication was infrequent, and his engagement was primarily passive or non-engaged. Unfortunately, this read-aloud only approach has also been noted in other classroom observations (Benson-Goldberg & Erickson, 2024; Browder et al., 2007). While reading the text is important, the adult book-

related talk used to support engagement and interaction is equally critical, if not more important (DeTemple & Snow, 2003; Ezell & Justice, 2005), particularly for students with CSN and CCN (Cheek et al., 2022; Erickson & Koppenhaver, 2020).

It is unknown why Cody did not have consistent access to aided AAC system during instruction at the beginning of the year or why he reportedly had no interest in using his aided AAC system. Unfortunately, restricted access to aided AAC is commonly reported in separate special education classrooms serving children with CSN and CCN (Benson-Goldberg & Erickson, 2024; Dorney & Erickson, 2019); however, based on his IEP, Cody had access to aided AAC in the form of a device purchased for his use. Cody's challenge was not access. It was disinterest and non-engagement, which may have reduced other's efforts to provide him ongoing access.

Importantly, as Cody's non-engagement decreased from 40% to nearly 0%, his teacher's use of Follow the CAR increased, as did Cody's access to graphic symbols printed on various size grids throughout observed sessions. Similar decreases in non-engagement have been reported as teachers transitioned from highly teacher-controlled literacy instruction to instruction focused on engagement, interaction, and meaning (Bock & Erickson, 2015; Geist et al., 2020). Cody's disengagement at the beginning of the year was not replaced by passive engagement but by active engagement with large increases in both initiations and responses. Cody's initiations and responses were ascribed communicative value and honored through repetitions and expansions, and aided language input was used to teach the use of aided AAC to generate symbolic equivalents to these communication efforts. These affirming and language-rich responses in the student's

modality may have resulted in Cody's steep and steady increase in communication during shared reading.

Changes in teacher practice and aided AAC access were concurrent with an increase in Cody's use of communication. The use of aided AAC is an accepted intervention to support communication for children with CSN and CCN (Brady et al., 2016; Ronski & Sevcik, 1996). At the beginning of the study, Cody was an infrequent nonsymbolic communicator. His communication increased quickly and became symbolic as his teacher increased her use of aided language input and manual signs while using the Follow the CAR approach. These outcomes are consistent with other research demonstrating the importance of aided language input (Benson-Goldberg et al., 2022; Erickson, Geist et al., 2021). As Martha was asked to describe any successes with shared reading, she commented, "They are realizing that they can communicate. There are small successes like we are teaching one student to point. To look down even if she doesn't know what she is saying yet. Another student understands when he says GO we do something. They are just realizing that they can communicate something...It's definitely a process, but a good process."

Implications for Teacher Educators, Teachers, or Novice Researchers

Given the reported low levels of engagement and language learning reported among many students with CSN and CCN (Burnes & Clark, 2021; Erickson & Geist, 2016), teachers may want to consider introducing an interactive approach to shared reading such as Follow the CAR. The approach provides a framework for shared reading that focuses on responsive meaning-making and increased access to aided AAC while providing aided language input (O'Neill et al., 2018) to teach the use of aided AAC.

This interactive approach has particular importance for students who do not currently have a symbolic means of communication and interaction (e.g., aided AAC) or symbolic communication to respond but not to initiate and interact.

The current study provides preliminary evidence of the potential improvement in engagement and interaction outcomes promoted by interactive-to-independent approaches like Follow the CAR. In the current study, the teacher supported one beginning communicator by demonstrating and supporting the use of multiple modes of communication (i.e., speech, manual signs, and graphic symbols displayed in grids). She also demonstrated the value of additional interactive strategies including following the students' lead, providing sufficient wait time to encourage student communication efforts, attributing meaning to communication efforts, and monitoring student engagement. Each of these, individually and in combination, may help teachers engage beginning communicators with little interest in other more structured forms of shared reading. Furthermore, like the teacher in this study, teachers, teacher educators, and other researchers can learn to implement these strategies by completing the free, open-source PD modules and using the self-reflection and coaching supports that are provided at <http://sharedreader.org>. The fact that these resources are available in online, on-demand formats makes them particularly useful for teachers of students with CSN and CCN who are often isolated (Rude & Miller, 2018) and report that they struggle to adapt literacy instruction for their students with CSN and CCN (Ruppar et al., 2011).

Teacher training programs may want to consider including training on interactive approaches to shared reading that support engagement and language growth among students with complex educational profiles associated with low incidence

populations. They too could access and use the open-source PD modules at sharedreader.org and help pre-service special education teachers learn to use strategies like aided language input while attributing meaning to student communication in any mode, providing sufficient wait time to encourage student initiations, and monitoring engagement.

Limitations and Future Directions

The generalizability of this descriptive case study is limited, as it may or may not apply to classrooms in other schools, systems, or geographic locations. Additionally, the design does not support causal connections between the Tar Heel Shared Reader implementation model, teacher behaviors, and student outcomes. The lack of a comparison group makes it impossible to isolate the effect of the intervention or eliminate the presence of confounding variables, but the documented history of Cody's limited interest in aided AAC and engagement during shared reading certainly suggest that the intervention had a positive impact. Further, given the dearth of literature in classroom implementation of interactive shared reading practices that focus on expressive communication for students with CSN and CCN, this study provides valuable information that can inform future studies that might use control groups, single-subject designs, or other (quasi)experimental approaches that could support causal inferences regarding the approach to shared reading.

Conclusion

This study documents how one teacher shifted her shared reading practice to align it with an interactive-to-independent approach and how a student increased his engagement, initiation, and communication. While the study focused on one student, the teacher learned to provide all her students with CSN and CCN with consistent access to personal aided AAC, use aided language input, honor and

respond to the unique ways that her students communicated, and focus on comments rather than questions during shared reading. The data point to changes in the teacher's own practice as she increased the frequency of each element of the Follow the CAR approach, and the data simultaneously point to positive

changes for the student. While the descriptive case study precludes causal inferences, the fact that changes in the teacher's behaviors coincided with growth in student engagement and communication after years of documented challenges in these areas is encouraging.

Funding

This work was supported by the U.S. Department of Education, Office of Special Education Programs under Grant No. H327S160005. The views expressed herein do not necessarily represent the positions or policies of the Department of Education. No official endorsement by the U.S. Department of Education of any product, commodity, service or enterprise mentioned in this publication is intended or should be inferred. Project Officer, Susan Weigert.

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Appendix A: Description of Professional Development Sessions for Educators

Month	Title of Session	Description of Session
September	Tar Heel Shared Reader Project Overview	Provided an overview of the project introduced shared reading as a strategy that focuses on the teacher-student interaction.
November	Follow the CAR	Described the elements of Follow the CAR (Comment, Ask for participation, Respond) and how to plan comments during shared reading.
December	GPS Helps You Follow the CAR	Introduced the web interface for Tar Heel Shared Reader and demonstrated how this technology can help educators Follow the CAR.
February	Changing Practice through Self-Reflection	Discussed the benefits of teacher self-reflection and how to use it to improve shared reading practice and student outcomes.
March	Selecting Books	Identified factors to consider when selecting books for shared reading in order to best match and build student language and communication abilities, while including a wide variety of academic content and interests.

Appendix B

SELF-ASSESSMENT: CLASSROOM TEACHER: For each item identified below, circle the number to the right that best fits your judgment of your knowledge and skills today. Then, reflect on your current practices and list a few examples that come to mind. The information you provide here will help our team prepare instructional materials and coaching supports that best match your professional development needs.

Questions and Reflection on Practice	Strongly Disagree	Disagree	Unsure / Neutral	Agree	Strongly Agree
1. I have experience using shared reading to support my students' early literacy development.					
Here are some of the strategies I use during shared reading:					
2. My classroom provides a lot of opportunities for my students to develop early literacy skills.					
Here are some examples of the things we do in my class to support early literacy learning:					
3. I include academic goals on my students' IEPs.					
Here are a few examples of the types of goals my students are working towards:					
4. I include literacy goals on my students' IEPs.					
Here are a few examples of the type of literacy goals my students are working towards:					
5. I have experience using Tar Heel Reader with my students.					
Here are some of the ways I've used Tar Heel Reader with my students:					
6. I feel comfort and confident in my ability to support early literacy learning using shared reading.					
I'd like additional training/experience with the following areas related to shared reading:					
7. I am able to engage my students actively during our shared reading interactions.					
Here are some of the things I do to keep my students engaged during shared reading:					

8. I feel comfortable and confident in my ability to use technology during literacy instruction with my students.					
I'd like additional training/experience with the following areas related to using technology during my instruction:					
9. I know how to support my students' communication during shared reading.					
Here are a few examples of the ways I support communication during shared reading:					
10. I regularly use symbols to demonstrate communication when interacting with my students and the book during shared reading.					
When I demonstrate the use of symbols during shared reading for my students, I do the following:					
11. I assess my students' engagement and interaction during shared reading.					
When I assess engagement and interaction during shared reading, I do the following:					

Appendix C

Tar Heel Shared Reader – Interview Guide

Introduction: The purpose of this interview is to help us understand the ways you currently engage in reading with your students and support their communication while reading with them.

1. What does your reading instruction look like each day? (follow with: do you use any programs?)
2. What do you know about shared reading?
3. How do you make decisions about the books you read during shared reading?
4. How do you make decisions about what to say and do with your students during shared reading?
5. What characteristics make it challenging for students to successfully engage in shared reading?
6. IF NOT ALREADY ADDRESSED: Do you have students who are unable to use speech to communicate during shared reading? If yes, how do you help them communicate and interact?
7. Can you describe any successes you have had with shared reading?
8. Can you tell me what you hope to gain by participating in Tar Heel Shared Reading?

Now I have just a few questions to ask about you and your training.

9. What is your age?

- ☐ 21-24 years old
- ☐ 25-34 years old
- ☐ 35-44 years old
- ☐ 45-54 years old
- ☐ 55-64 years old
- ☐ 65-74 years old

10. What is your ethnicity.

- ☐ White
- ☐ Hispanic or Latino
- ☐ Black or African American
- ☐ Native American or American Indian
- ☐ Asian / Pacific Islander
- ☐ Other

11. What is the highest degree or level of school you have completed? *If currently enrolled, highest degree received.*

- ☐ Bachelor's degree
- ☐ Master's degree
- ☐ Professional degree
- ☐ Doctorate degree

12. Counting this school year, how many years have you been a school teacher, including part-time

teaching?

13. Counting this school year, how many years have you taught special education, including part-time teaching?
14. Counting this school year, how many years have you taught in your current school, including part-time teaching?
15. Do you have a teaching license? ☐yes ☐no
16. In what areas do you have a teaching license?
17. How well did your teaching program prepare you to teach literacy?
18. How well did your teaching program prepare you to teach literacy to students with significant disabilities?

Appendix D

Characteristics of Shared Reading Sessions and the Books Read

Shared Reading Session/ Month	Duration of Session (minutes: seconds)	Title (Author, Publication Date)	Number of Pages	Total Number of Words	Total Number of Sentences, Phrases, and Single Word Expressions
1 October	10:12	<i>Spookyrumpus</i> (Mitton, 2005)	26	313	Sentences: 38 Phrases: 12 Words: 10
2 January	15:33	<i>All You Need for a Snowman</i> (Schertle, 2007)	23	227	Sentences: 13 Phrases: 40 Words: 6
3 February	9:50	<i>Bubbles</i> (A, n.d.)	7	32	Sentences: 6 Phrases: 1 Words: 0
4 Early March	9:54	<i>Don't Stare at Her Hair</i> (AD53344, n.d.)	*17	68	Sentences: 13 Phrases: 4 Words: 0
5 Late March	10:02	<i>Martha The Cow</i> (CLDS, n.d.)	20	85	Sentences: 10 Phrases: 10 Words: 0

Note. *Teacher only read 11 of the pages – 7 sentences and 4 phrases