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THE EFFECTS OF SIGN LANGUAGE ON ENGAGEMENT IN EARLY LITERACY ACTIVITIES FOR YOUNG CHILDREN WITH AUTISM

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Abstract. Language Arts and Literacy is one developmental domain that is addressed in the early childhood classroom (California Department of Education, 2008; California Department of Education, 2013, p. iv). Included within the developmental domain of Language and Literacy is, participating in reading activities with others, expressive and receptive language skills, engagement, as well as, emergent literacy skills and augmentative and alternative communication (AAC) (California Department of Education, 2008; California Department of Education, 2013; Christie et al., 2014; Machado 2016; Ogletree, 2021; Westerveld et al., 2017). The skills that are included within the developmental domain of and standards of language and literacy, such as engagement in literacy, serve as the foundation in which young children are building upon to support later reading success (California Department of Education, 2008). Additionally, the importance of interest and engagement in literacy activities has been documented as it plays a key role in developing early literacy skills (California Department of Education, 2008). Therefore, due to the impacts of engagement in literacy, emergent literacy and AAC, on a child’s future reading success, it is critical that these skills are thoroughly and effectively addressed in the early childhood classroom.

Students with autism tend to present with unique needs in the area of language and literacy development (Chen & Kuo, 2017; Fleury & Hugh, 2018; Fleury & Lease, 2018; Lanter et al., 2013; Westerveld et al., 2017). Approximately 30–50% of students with autism who are a school-age struggle in reading (Ariculi et al., 2013; Nation et al., 2006; Ricketts, 2011, as cited in Wicks et al., 2020). Students with autism have unique areas of need in developing emergent literacy skills and engaging in early literacy activities (Chen & Kuo, 2017; Fleury & Lease, 2018; Westerveld et al., 2017). A unique area of need is meaning-related skills, including comprehension of text (Chen & Kuo, 2017; Westerveld et al., 2017). An additional unique area of need is joint attention with early literacy activities (Fleury & Hugh, 2018; Wicks et al., 2020). It has been found that students with autism engage less and request shared reading less often than typically developing peers (Fleury & Hugh, 2018; Lanter et al., 2013). Educators must take intentional steps to support students with autism in the classroom and implement various strategies. For example, AAC and embedded instruction are strategies that educators can implement to support the development of critical emergent literacy skills (Sandall et al., 2019; Olgetree, 2021; Rahn et al., 2019). However, although research exists on the importance of intentionally developing early literacy skills, AAC and embedded instruction, there is little current research on how embedding sign language, a form of unaided AAC, impacts engagement in emergent literacy activities (Cologon & Mevawalla, 2018; Rose et al., 2015; Tan et al., 2014). This research study explored the use of using core and fringe vocabulary using sign language to increase emergent literacy skills in young children diagnosed with autism. There were four children who participated in this study. The children in this study were enrolled in a special day class for children in transitional kindergarten and kindergarten (ages 4–5). The results of the study demonstrated that some emergent literary skills improved when sign language was introduced during circle time, specifically shared reading time.

Keywords: Early Literacy, Autism, Sign Language, Augmentative and Alternative Communication, Special Education

EARLY CHILDHOOD EDUCATION AND CHILDREN WITH AUTISM

Early childhood education focuses on multiple domains of development including, social-emotional, physical, cognitive, and language and literacy development (California Department of Education, 2008; Machado, 2016). Each domain must be addressed in the classroom through intentional planning by the teacher. Language and literacy development is a domain that encompasses various skills, such as vocabulary, print concepts, expressive and receptive communication, comprehension of text, retelling and interest and engagement in literacy (California Department of Education, 2008; California Department of Education, 2013; Machado, 2016). Emergent literacy is included in this domain and can be defined as behaviors, attitudes, concepts, and skills that are precursors to and eventually develop into literacy skills such as reading and writing (Christie et al., 2014; Machado 2016; Westerveld et al., 2017).

Young children participating in early childhood education programs can receive special education services under various eligibilities according to the Individuals

with Disabilities Education Act (IDEA) (Smith et al., 2018). There are 13 categories in which children who are preschool age to twenty-two years old are eligible for special education services through the IEP (Smith et al., 2018). Young children can qualify for special education services under eligibilities such as, autism spectrum disorder (ASD), other health impairment (OHI), speech and language impairment (SLI) and intellectual disability (ID) (Smith et al., 2018). This research study focused on young children who are eligible for special education services under the eligibility of autism spectrum disorder (ASD). Therefore, it is imperative to understand the characteristics of young children with autism and the impacts on learning and development.

Children with ASD demonstrate core characteristics in the areas of social interaction, communication and in restricted and repetitive behaviors or interests (Smith et al., 2018). Children with ASD tend to demonstrate an area of need in joint attention skills and they may prefer to play independently (Fleury & Hugh, 2018; Smith et al., 2018; Wicks et al., 2020). Additionally, children with ASD may demonstrate delays in language, as well as, areas of need in functional communication and benefit from assistive technology or augmentative and alternative communication (AAC) to support their communication and interaction with others (Smith et al., 2018). These characteristics of ASD can impact student development, including behavior and communication (Smith et al., 2018). More specifically, these characteristics can impact literacy development.

Joint attention skills and social interactions are critical components of shared reading, as adults encourage children's active participation in the activity, ultimately supporting important literacy skills (Blewitte et al., 2008; Crain-Thoreson & Dale, 1999; Doule & Bramwell, 2006; Hargrave & Sénéchal, 2000; van Kleeck, 2008; Wasik & Bond, 2001, as cited in Milburn et al., 2014). Literacy skills such as vocabulary, "oral narrative skills", comprehension and expressive language have been found to be supported through shared book reading (Crain-Thoreson & Dale, 1999; Dickinson & Smith, 1994; Gerde & Powell, 2009; Justice et al., 2005; Hargrave & Sénéchal, 2000; Lever & Sénéchal, 2011; Longian & Whitehurst, 1998; Roberts et al., 2005; Wasik & Bond, 2001; Zevenbergen et al., 2003, as cited in Milburn et al., 2014, p. 109). Additionally, in order to participate and engage in literacy activities, individuals must have a consistent and reliable means of communication. Language and literacy experiences are socially constructed, as Vygotsky's socio-cultural theory on language development discusses the importance of context and social interactions in the development of language (Hetherington et al., 2005, as cited by Milburn et al., 2014; Milburn et al., 2014; Vygotsky, 1978, as cited by Milburn et al., 2014). Therefore, it is critical to focus on addressing skills in communication and social interactions when working with children with ASD, as these are core needs and ultimately impact literacy development (Smith et al., 2018).

EMERGENT LITERACY DEVELOPMENT IN YOUNG CHILDREN WITH AUTISM

Emergent literacy, also referred to as early literacy, can be defined as young children's behaviors, attitudes, concepts, and skills that are precursors to and eventually develop into literacy skills such as reading and writing (Christie et al., 2014; Machado, 2016; Westerveld et al., 2017). Emergent literacy skills encompass a range of skills to be addressed in the early childhood classroom. Emergent literacy skills include, but are not limited to, awareness of print, knowledge of letters, phonological awareness, and interest and engagement in literacy and concepts of print (California Department of Education, 2008; Machado, 2016).

Knowledge of letters includes recognizing letters in the alphabet, whereas phonological awareness includes understanding syllables and sounds (California Department of Education, 2008). Emergent literacy also consists of understanding how to correctly hold a book and an understanding of various aspects of a book, including the cover and title (California Department of Education, 2008). Most pertinent to this study is literacy interest and engagement in emergent literacy skills, as well as, the reading foundational skill of "actively engag[ing] in group reading activities with purpose and understanding" (California Department of Education, 2008: 69; California Department of Education, 2013: 12; Fleury & Hugh, 2018). Engagement and motivation are essential in developing critical early literacy skills that impact future reading skills (California Department of Education, 2008).

Teachers must implement various strategies to teach young children early literacy skills effectively. Reading aloud to children and shared book reading are commonly implemented activities to support young children's emergent literacy skills that have dated back to the early 1900s (Christie et al., 2014; Fleury & Lease, 2018; Machado, 2016; Shickendanz, 1986, as cited in Christie et al., 2014). However, reading aloud alone is not sufficient. To effectively support student learning and development, teachers and caregivers must implement shared book reading and interact and engage with students (Justice & Pence, 2005, as cited in Christie et al., 2014; Terrell & Watson, 2018). Implementing shared book reading, an empirically based intervention, is important because engaging and participating in shared book reading has proven to support young children in their vocabulary development, expressive language, and comprehension of stories (Crain-Thoreson & Dale, 1999; Dickinson & Smith, 1994; Gerde & Powell, 2009; Justice et al., 2005; Roberts et al., 2005; Wasok & Bond, 2001, as cited in Milburn et al., 2014; Justice & Pullen, 2003). It supports children from all backgrounds, including English Learners (Collins, 2005, as cited in Milburn et al., 2014). Effective strategies include introducing the story before reading it, reading at a pace that is moderate and with expressions that the characters would show, as well as promoting interactions while the book is being read (Machado, 2016; Smith et al., 2008, as cited in Christie et al.,

2014). Additionally, making comments as the story is read and promoting participation through wait time are recommended strategies to support engagement during shared reading (Center for Literacy and Disability Studies, n.d.).

Approximately 30–50% of students with autism who are school-age struggle in reading (Ariculi et al., 2013; Nation et al., 2006; Ricketts, 2011, as cited in Wicks et al., 2020). Students with autism have unique areas of need in developing emergent literacy skills and engaging in early literacy activities (Chen & Kuo, 2017; Fleury & Lease, 2018; Westerveld et al., 2017). A unique area of need is meaning-related skills, including comprehension of text (Chen & Kuo, 2017; Westerveld et al., 2017). An additional unique area of need is joint attention with early literacy activities (Fleury & Hugh, 2018; Wicks et al., 2020). It has been found that students with autism engage less and request shared reading less often than typically developing peers (Fleury & Hugh, 2018; Lanter et al., 2013). However, strategies such as repetition and repeated book reading have proven to be beneficial in supporting learning in children with autism, as well as in supporting joint engagement in early literacy activities (Fleury & Hugh, 2018; McGee & Schickendanz, 2007, as cited in Christie et al., 2014). In turn, predictability is embedded into instruction, students become familiar with the story, and engagement is supported (Fleury & Hugh, 2018). Embedding student interest and providing choices are examples of strategies that support students with autism and have implications for story time. In addition to the strategies discussed above, augmentative and alternative communication (AAC) and alternate response methods are common accommodations implemented to support students with autism (Smith et al., 2018). These strategies are pertinent to the current study as they will be embedded throughout the intervention.

STRATEGIES TO SUPPORT EMERGENT LITERACY SKILLS

Emergent literacy skills are addressed in the early childhood classroom and build the necessary foundation for future reading success (California Department of Education, 2008). Literacy skills addressed in the early childhood classroom are intended to support and further their learning in the following grade levels (California Department of Education, 2013). Educators must implement a range of strategies to support emergent literacy development in all children. Embedded learning opportunities are one example of a strategy to support emergent literacy in the classroom, as it utilizes a naturalistic teaching approach within the daily routine, that is child-focused (Division for Early Childhood, 2014; Rahn et al., 2019; Sandall et al., 2019; Snyder et al., 2015, as cited in Sandall et al., 2019). Embedding the universal design for learning (UDL) framework within instruction in the school day is also critical, as this proactive approach to teaching, allows students to learn and demonstrate their knowledge in various ways (Horn & Banerjee, 2009; Smith et al., 2018).

Augmentative and alternative communication (AAC) has also proven to support communication and literacy development and must be embedded in the daily routine (Ogletree, 2021). There are various types of AAC, including aided AAC and unaided AAC (Cologon & Mevwalla, 2018; Ogletree, 2021). Aided AAC involves utilizing a tool outside of the learner, such as a communication device or a paper-based communication system, while unaided AAC does not involve a tool outside the learner, such as using sign language to support language development (Cologon & Mevwalla, 2018; Ogletree, 2021; Pattison & Robertson, 2016; Tan et al., 2014; Wright et al., 2013).

While there is a lack of extensive empirical research that addresses how sign language impacts learning and development, a few studies have been conducted on this topic. For example, Daniels (1996, 2004) found that students‘ receptive language and reading skills were supported when sign language was implemented in a kindergarten and preschool classroom. More specifically, Daniels (1996) found that not only were receptive language skills supported when signs were embedded in the preschool classroom, but this gain in skills continued through kindergarten. Results from Daniels (2004) research study revealed that when sign language was embedded in a kindergarten classroom, their receptive language skills increased and students earned high scores on reading placement assessments. In addition to impacting language and literacy development, other positive impacts have been discovered when sign language is embedded in the classroom. For example, embedding and teaching signs to all children in a classroom has implications for positive effects on inclusion (Bereton, 2006, as cited in Bereton, 2010; Cologon & Mevawalla, 2018). However, as previously stated there is limited research on this topic.

SUPPORTING STUDENTS WITH AUTISM

Individuals with ASD tend to demonstrate areas of need in social interactions and communication, as well as, demonstrate a core characteristic of repetitive and restricted interests and behaviors, which in turn can impact their early development of critical language and literacy skills (Smith et al., 2018). In the area of literacy development, students with autism demonstrate various strengths and areas of need. For example, students with autism tend to present strengths in code-related emergent literacy skills, such as in letter recognition, but present unique areas of need in emergent literacy (Westerveld et al., 2017). For example, students with autism tend to show an area of need in meaning-related skills such as comprehension of stories and engage less, and request shared reading less than their peers (Chen & Kuo, 2017; Fleury & Hugh, 2018; Fleury & Lease, 2018; Lanter et al., 2013; Westerveld et al., 2017).

Based on current research and our understanding of students' with ASD's core characteristics and strengths and needs, instruction must be tailored to address each

student's unique areas of need and build off of each student's strengths. For example, a core characteristic of autism is restricted and repetitive interests (Smith et al., 2018). This can be utilized as a strength and student interests can be embedded within early literacy activities, such as through reading a favorite story with a preferred character to increase engagement and interest in literacy, one of the literacy strands addressed in the California Preschool Learning Foundations (California Department of Education, 2008; Smith et al., 2018). An increase in engagement can perhaps build the necessary foundation to further support literacy skills through enhanced attention and in turn increase a student's ability to retell a story or answer questions, a Common Core State Standard for reading in Kindergarten (California Department of Education, 2013).

Additionally, based on research it is understood that a common area of need for students with autism is in comprehension and increasing the time spent in engaging in shared reading, as these are both skills and activities needed to support the development of early literacy (Chen & Kuo, 2017; Fleury & Hugh, 2018; Lanter et al., 2013; Westerveld et al., 2017). Therefore, accommodations and strategies must be embedded in the school day to address these areas of needs. For example, AAC and alternate response methods are common types of accommodations to support students with ASD (Smith et al., 2018). Assistive technology and AAC support children in communicating, in their social interaction, as well as, in their literacy development (Olgetree, 2021; Tan et al., 2014). Priming and increased wait time are also strategies to support learning and development for students with ASD (Fleury & Hugh, 2018; Koegel et al., 2003; Smith et al., 2018).

AUGMENTATIVE AND ALTERNATIVE COMMUNICATION AND YOUNG CHILDREN WITH AUTISM

Augmentative and alternative communication (AAC) is a field of research and clinical practice that focuses on multiple means of communication intended to support individuals in their communication skills and language and literacy development (Ogletree, 2021; Tan et al., 2014). Although it was thought that AAC hinders speech development and young children are too young to begin utilizing AAC, it has been proven that AAC does not impede speech but rather supports its development (Ogletree, 2021; Blischak, 1999; Blischak et al., 2003; Leech & Cressm 2011; Millar et al., 2006; Romski & Sevcik. 1996, as cited in Ogletree, 2021). Early language and literacy instruction and experiences play a critical role in developing expressive and receptive language skills (Ogletree, 2021). Therefore, educators must implement and embed a wide range of strategies in the classroom to support early language and literacy development.

AAC addresses communication and early literacy skills, including reading and written literacy (Ogletree, 2021). AAC can be utilized temporarily to support a

child in their communication as they continue to develop their language skills, or it can be used continuously, depending on their needs (Barton et al., 2006; Beukelman & Light, 2020; Branson & Demchak, 2009; Romski & Servcik, 1996; Sevick & Rinski, 2016, as cited in Ogletree, 2021).

In the field of AAC, there are recommended practices to best support individuals who utilize AAC. For example, frequent modeling and use of AAC in the natural setting has proven beneficial for expressive and receptive language skills (Sennott et al., 2016; Solomon-Rice & Soto, 2009). AAC encompasses both aided and unaided forms, with aided AAC involving a tool, something outside of the individual (Cologon & Mevwalla, 2018; Ogletree, 2021). On the other hand, unaided AAC does not involve any tool outside of the individual (Cologon & Mevwalla, 2018; Ogletree, 2021). Sign language is a type of unaided AAC, as it does not require a tool outside of the individual (Cologon & Mevwalla, 2018).

Key Word Sign (KWS) is a type of unaided AAC that embeds the use of sign language within spoken language to support functional communication (Cologon & Mevawalla, 2018; Rose et al., 2015; Tan et al., 2014). When implementing KWS, individuals communicate in complete sentences in spoken language while simultaneously embedding signs to highlight the critical parts of the communication (Cologon & Mevawalla, 2018). It has been found that KWS can support children in their language development by increasing their mean length utterance (Pattison & Robertson, 2016; Tan et al., 2014). KWS can also support vocabulary development and shared communication for young children (Cress & Marvin 2003; Dunst et al., 2011; Powell, 1999; Vandereet et al., 2011, as cited in Cologon & Mevawlla, 2018). It is not a new concept to introduce signs to students with autism, as research on this topic dates back to the 1970s (Goldstein, 2002; Millar et al., 2006; Remington & Clarke, 1983, as cited in Rose et al., 2015). Children with autism have successfully acquired signs after being taught (Schaeffer et al., 1977, as cited in Rose et al., 2015; Tan et al., 2014). For example, Tan et al. (2014) found that all three preschool students with autism who participated in the study acquired signs after being introduced to KWS and generalized some signs learned. Additionally, embedding KWS in a preschool classroom supported participation, and increased appreciation of diversity (Brereton, 2008, as cited in Cologon & Mevawalla, 2018). While research has been conducted on sign use with students with autism and KWS, the question that persists is how does embedding signs within early literacy activities support engagement for young children students with autism.

TEACHING

It has been proven that both AAC and simultaneous communication, also known as, code-blends, support learning and development (Ogletree, 2021; Pattison & Robertson, 2016; Weisberg et al., 2015). Simultaneous communication or code-

blends includes communication through two different means that occurs at the same time, such as communicating through signs and spoken language at the same time (Pattison & Robertson, 2016; Weisberg et al., 2015; Yoder & Layton, 1988, as cited in Pattison & Robertson, 2016). Key Word Sign is an example of simultaneous communication as keywords in communication is communicated through signs as the message is also being conveyed through spoken language (Yoder & Layton, 1988, as cited in Pattison & Robertson, 2016). This type of communication can support learning by increasing efficient neural processing and having a positive impact on mean length utterances (Pattison & Robertson, 2016; Tan et al., 2014; Weisberg et al., 2015). Additionally, when signs are utilized, students are engaging more of their senses which supports learning and understanding (Bereton, 2010; Edwards et al., 1998; Kátai et al., 2008; Sylwester, 1998, as cited in Bereton, 2010). This evidence has implications for the current study.

In choosing which signs to teach to young children, there are multiple aspects to consider. For example, in the field of AAC, both core and fringe vocabulary words are a topic of interest (Beukelman & Mirenda, 2005, as cited in Tan et al., 2014; Ogletree, 2021). Project Core's focus is on aided AAC and the universal core vocabulary, a set of 36 meaningful, beneficial words that can be utilized for communication across settings and activities (Geist, 2020; Ogletree, 2021). It includes words that are the most frequently utilized words in both spoken and written language and are the words that children most often use in their communication (Banajee et al., 2003; Deckers et al., 2017; Trembath et al., 2007, as cited in Ogletree, 2021; Geist, 2020). They are common first words for children and align with the words taught during reading and writing instruction (Banajee et al., 2003; Clendon & Erickson, 2008; Dolch, 1995, as cited in Geist, 2020). The core vocabulary is intended for individuals to have the ability to communicate with one word but can also be easily combined with others (Ogletree, 2021).

Additionally, fringe vocabulary words are a topic in the field of AAC. Fringe vocabulary words differ from core words, as they are words intended for specific contexts and settings (Beukelman & Mirenda, 2005, as cited in Tan et al., 2014). Therefore, fringe vocabulary is not as generalizable as core vocabulary and is not as efficiently utilized across settings (Beukelman & Mirenda, 2005, as cited in Tan et al., 2014). Tan et al. (2014) found that three young children who participated in KWS intervention generalized some of the core signs taught in various play activities. Therefore, core and fringe vocabulary words have implications for the current study and the words chosen to embed in sign language during early literacy activities.

The field of AAC includes best practices in teaching AAC to children. Modeling language is a critical component of AAC instruction (Ogletree, 2021; Sennott et al., 2016). Providing students with frequent modeling supports the learning of language (Sennott et al., 2016; Solomon-Rice & Soto, 2009). This has implications

for the current study and the importance of addressing the frequency in which signs are taught and embedded within early literacy activities to support learning and engagement. Project Core also advocates for and supports education professionals in teaching AAC to children through implementing naturalistic teaching strategies (Geist, 2020). This practice includes utilizing the daily routine and academic activities that the student participates in, incorporating student interests, and following the student's lead (Pindiprolu, 2021, as cited in Geist, 2020). Best practices will be implemented in the present study, as teaching will be embedded in daily emergent literacy routines.

In the discussion of teaching signs to young children, it is imperative to note the critical importance of ensuring that sign language is presented in the classroom in a manner that is respectful to the Deaf community and Deaf culture, as American Sign Language (ASL) is the Deaf community's language and is connected to their culture and identity (Cologon & Mevawalla, 2018; Holcomb, 2013). In teaching signs, teachers taught about the Deaf community and reported the importance of teaching about the Deaf community and ASL first (Bereton, 2010; Bereton, 2008, as cited in Cologon & Mevawalla, 2018; Cologon & Mevawalla, 2018). This information is highly pertinent as it will be properly addressed in the current study.

THE NEED FOR THE CURRENT STUDY

While there is evidence of the importance of supporting language and literacy development and the positive impacts of sign language on communication development, there is a lack of current research on embedding sign language within early literacy activities on student learning, specifically engagement. The purpose of this study is to understand the effects of incorporating sign language during story time on engagement in early literacy activities for young children with autism. The primary research questions for this study are as follows: 1) How does incorporating signs affect engagement in early literacy activities, specifically story time? and, 2), How are children's initiations and responses to bids for interactions during shared reading, impacted when sign language is embedded?

METHODOLOGY

Research Design

Action research is implemented in the field of education to gain information on schools and the teaching and learning that takes place within (Mills & Gay, 2019). Action research is implemented by education professionals, including teachers, and is completed for teachers by teachers (Mills & Gay, 2019). Key components of action research include, it is relevant and accessible (Mills & Gay, 2019). My research question aligns with the definition of action research and its key compo-

nents. My research question focuses on teaching and learning in my classroom and is being implemented by the teacher with the intent of supporting engagement in early literacy activities. It is relevant and accessible as it was addressed in my classroom. Based on the definition and key components of action research, action research is a good fit to answer my research question.

A mixed methods research design was implemented to ensure a complete and accurate description of how incorporating sign language within early literacy activities effects engagement in young children with autism. Therefore, both qualitative and quantitative data were collected. More specifically, an exploratory sequential design was implemented, with qualitative data being highly emphasized (Mills & Gay, 2019). This type of research allows for qualitative data gathered through observations and field notes, to be further validated by quantitative data gathered by a rating scale, leading to a complete picture of engagement. The following assessment tools were utilized for the current research study: 1. Participant observation and field notes; 2. Emergent Literacy Skills Checklist 3. Brigance Inventory of Early Development III (IED III); 4. Emergent Literacy Rating Scale; 5. Shared Reading Fidelity Checklist

Participant Observation and Field Notes. First, an authentic assessment, with qualitative data and the use of observations and field notes, was implemented throughout the school day to gather data on emergent literacy skills, communication skills, and initiations and responses during shared reading, prior to introducing sign language. Participant observations and field notes followed a developed protocol that included the following information: the date, the time of the observation, the participant name, the context in which the observation is taking place (description of the classroom, the activity being implemented, the number of individuals present, etc.) and the inclusion of descriptive, objective notes and reflective notes (Mills & Gay, 2019). Data sheets following the developed protocol for participant observations and field notes were implemented throughout the study, prior to intervention to determine the baseline and during the study to understand the effects of intervention. Participant observations were utilized to gather concrete, specific examples of how students initiated and responded to bids for interaction and in which contexts. Participant observations were completed during and after story time. Objective notes included a description of the exact behaviors that were seen and heard. Each child had a file folder holding their own set of data sheets for each assessment. Data sheets were organized by the day the observations were taken so that they were organized chronologically. This supported data analysis as there was a progression of data in order, from beginning, middle and end.

Emergent Literacy Skills Checklist. The emergent literacy skills checklist was adapted from the Desired Results Developmental Profile and the "All Children Can Read: Literacy Skills Checklist", was also utilized pre- and post- assessment to gather baseline data on the child's current overall emergent literacy skills and

data on the child's skills after intervention (California Department of Education, 2015; McCann, 2016). The Desired Results Developmental Profile guided the development of authentic assessments utilized in the study, with a focus on specific measures. For example, the measures Language and Literacy Development (LLD) 5, interest in literacy, LLD 1, receptive language, LLD 3, expressive language and LLD 6, comprehension of age-appropriate text guided the assessments (California Department of Education, 2015: 13, 15, 17, 18). These measures, along with the "All Children Can Read: Literacy Skills Checklist" (McCann, 2016) guided the development of the emergent literacy checklist for this study. Authentic assessment was then utilized to complete this checklist and to gather pre and post assessment data on childrens' overall emergent literacy skills.

The Brigance Inventory of Early Development III (IED III). The Brigance Inventory of Early Development III (IED III), was utilized as the protocol pre- and post-assessment to gather data on pre-literacy skills. Sections of the Brigance that were pertinent to this study were selected. The following section of the IED III was selected, Academic/Cognitive: Literacy (Brigance, 2013: 21), subsection, "Response to and Experience with Books" (Brigance, 2013: 21). The purpose of this tool was to gather additional data and gain a deeper understanding of each participants' overall emergent literacy skills, including how participants participate and engage in literacy activities.

Emergent Literacy Rating Scale. A self-developed emergent literacy rating scale was then implemented during and after story time to gather quantitative data on frequency of engagement in early literacy activities when sign language is incorporated. The emergent literacy rating scale stated, "circle the option that best describes how often (name of participant) initiated communication during shared reading" or "circle the option that best describes how often (name of participant) responded to bids for interactions during shared reading". The following options were included on the rating scale: 0, 1 or 2 times, 3 times, at least 4 times.

Shared Reading Fidelity Checklist. A shared reading fidelity checklist that has been adapted from the current literature, was also implemented (Lorio & Woods, 2020). The checklist outlined each step that must be taken before, during and after each shared reading activity to ensure that the intervention is carried out as intended, with consistency (Lorio & Woods, 2020). The checklist combined recommended strategies for shared reading, Key Word Sign, and supports for children with autism. It was reviewed and completed both prior to and after shared reading to ensure consistency and that the intervention is implemented as intended.

Pre-assessment data was gathered for approximately one week. Next, sign language was embedded within the focus area, story time. Data was taken across five weeks of instruction with the intervention embedded, during and after story time. Authentic assessment is important to this study as it accounts for the individual nature in which engagement occurs. Then, consistent with an exploratory sequen-

tial research design, quantitative data was gathered next (Mills & Gay, 2019). A self-developed emergent literacy rating scale that measures frequency of student initiations and responses during shared reading, was implemented pre and post assessment. This type of data is important for the purpose of this study to further understand and validate how incorporating sign language in early literacy activities impacts engagement, specifically initiations and responses. Consistent with an exploratory sequential research design, qualitative data was emphasized for this study (Mills & Gay, 2019).

Participants and Setting

Participants

Criterion-sampling was utilized to select the participants for this study. Participants were selected from the population in a Special Day Class (SDC) Transitional Kindergarten (TK) and Kindergarten classroom. Pre- intervention, the population of children in the classroom included a total of 8 students who attend a full day TK and Kindergarten program. The current study included five participants, the special education teacher who was the researcher and four children who receive special education services under the eligibility of autism. Children who are four and five years old were selected for this study. Two children were in transitional kindergarten and two were in kindergarten. Children who are eligible for special education services under autism spectrum disorder were selected. Children participating in the study are White, Japanese and American Indian or Alaska Native. All participants' native language is English. Three children were male and one was female.

Confidentiality was maintained throughout the study, as information related to names of participants and location in which the study took place were not released. Data sheets utilized throughout the study were kept in a closed file folder when not in use and locked in a secure place, to maintain confidentiality. To gain informed consent, a letter that informs parents and guardians of the study being conducted in the classroom, was written and sent home to families in their native languages.

Setting

The school site that the study took place in, is located in Southern California. The study was implemented in a Moderate/Severe Special Day Class (SDC) TK and Kindergarten classroom that is located on an elementary school campus. The SDC TK and Kindergarten program were full day programs that included a total of 8 children prior to intervention and a total of 6 children during intervention. There were two other SDC classes located on the same campus. Additionally, there were multiple general education TK and Kindergarten classes held on the same site. The

four children participating in this study are in the Moderate/Severe SDC TK and Kindergarten classroom the entire day, except for when participating in activities with their peers, such as at recess, lunch and within school-wide assemblies. The SDC program was taught by the researcher, a special education teacher. There were also three paraeducators present throughout the school day to support meeting the needs of the students in the classroom.

Procedure

Pre-test data collection began prior to implementing the intervention. Pre-assessment qualitative data from participant observation and field notes was gathered for approximately one week to gain an understanding of current student engagement in early literacy activities. The skills that were focused on for observations are initiations such as requesting or commenting, as well as, responding to bids for interaction during shared reading. A pre-assessment of skills and engagement was also conducted through the use of the emergent literacy rating scale, emergent literacy skills checklist and the Brigance Inventory of Early Development III (IED III). The emergent literacy rating scale assessed the frequency of initiations and responses. The emergent literacy skills checklist was completed through authentic assessment and assessed overall emergent literacy skills (California Department of Education, 2015; McCann, 2016). Lastly, the Brigance Inventory of Early Development III (IED III) was utilized (Brigance, 2013).

Early literacy activities are already embedded throughout the school day. Story time is one early literacy activity that is embedded within each school day and is the area of focus for this study. Therefore, during and after story time, qualitative data via participant observations and field notes were gathered pre-test, prior to the implementation of sign language, to serve as the baseline. A self-developed emergent literacy rating scale was then implemented during and after story time to learn how often students engage in early literacy activities, addressing the following question, how often does the student initiate (e.g. request or comment) or respond within a literacy activity? Data collection prior to the implementation of sign language was gathered for approximately one week. Once data was collected pre-test, sign language was introduced within early literacy activities. Story time continued to be embedded within the daily routine and signs were introduced during this time. These activities were implemented in a whole group setting. The special education teacher followed strategies outlined for shared reading and Key Word Sign. For example, aligning with principles of Key Word Sign, during story time, key words, both core and fringe vocabulary, in the chosen story were previewed and taught to students in sign language prior to reading the story (Cologon & Mevawalla, 2018).

Consistent with recommendations for shared reading, the special education teacher made comments as the story is read, expanded on children's communication, repeated what was said, and encouraged student participation through strate-

gies such as wait time (Center for Literacy and Disability Studies, n.d.; Hatch et al., 2017; Whitehurst et al., 1988; Ezell & Justice, 2000, as cited in Justice & Pullen, 2003). Additionally, strategies to support children with autism were embedded, including repetition and repeated book reading (Fleury & Hugh, 2018; Koegel et al., 2003; McGee & Schickendanz, 2007, as cited in Christie et al., 2014; Smith et al., 2018). Sign language was embedded for five weeks. To ensure fidelity of implementation, the shared reading fidelity checklist was implemented.

Children were given the opportunity to practice the signs taught. Signs were repeated multiple times prior to reading the story and throughout to support learning. Children also had the opportunity to practice signs within other daily routines of the classroom such as within centers, snack time and play time. Observations and data were taken within these daily routines to observe generalization of skills learned from story time. Questions that were addressed include, do children initiate using signs during other parts of the school day (e.g. to request or comment) with teachers or peers? and do children respond to bids for interactions from teachers or peers using signs?

Qualitative and quantitative data was collected throughout the five weeks of implementation and data analysis was continuous. Observational data and field notes following the developed protocol, was gathered immediately after shared reading and the emergent literacy rating scale was implemented next to gather numerical data (Mills & Gay, 2019). It was expected that child engagement, specifically, their skills in initiations or responding, would increase through their attempts and use of signs and increased attention and focus on story time. Data gathered throughout the project and at the end of the five weeks, served as a chronological progression of engagement and was analyzed to gain an understanding of how incorporating sign language in early literacy activities impacted engagement.

Data Analysis

Intentional participant observations and field notes were gathered and kept in chronological order to support accurate data analysis. Notes were carefully read and common themes, patterns and categories were identified among the qualitative data gathered (Mills & Gay, 2019). The self-developed emergent literacy rating scale utilized to gather numerical data on how often students initiate or respond in early literacy activities, was also gathered and kept in chronological order to support analysis of data and to compare pre and post test results. An analysis of the numerals identified on the emergent literacy rating scale revealed if the number of times children engaged or participated in story time was impacted when sign language was incorporated. Pre and post- assessment results gathered from the emergent literacy skills checklist, rating scale and the Brigance Inventory of Early Development III (IED III) were examined to determine the impacts of the intervention.

RESULTS

Pre-Intervention Emergent Literacy Skills Checklist and Emergent Literacy Rating Scale

The base-line data for the emergent literacy skills checklist demonstrated that prior to intervention, participants demonstrated a wide range of skills. Child 1 and 2, demonstrated the ability to respond with one or two-words, point to pictures in a book, repeat known aspects of a story, label items, comment on stories, point to pictures and look for preferred pictures but did not yet demonstrate the ability to re-tell, understand characters or events or ask questions about stories (California Department of Education, 2015; McCan, 2016). Child 3 and 4, demonstrated the ability to explore books and prefer certain stories but did not yet demonstrate the ability to respond with one or two-words, point to pictures in a book, repeat known aspects of a story or label items (California Department of Education, 2015; McCan, 2016).

The base-line data for the emergent literacy rating scale found that prior to intervention, participants demonstrated a wide range of skills. Children 1 and 2 initiated communication and responded to bids for interactions at least 4 times during shared reading. Children 3 and 4, did not initiate communication and respond to bids for interaction during shared reading.

Pre-Intervention Participant Observation and Field Notes

Based on observations of literacy interactions that occurred during circle time in which shared reading activities were presented, children in this study demonstrated a range of skills. Children 1 and 2 responded to bids for interactions through filling in the blanks during shared reading of a familiar story. For example, if the teacher stated "I see.." and paused, Children 1 and 2 would fill in the blank with the item or animal they saw in the story. Additionally, Children 1 and 2 initiated interactions through commenting independently during shared reading based on the pictures shown on the pages. Specific examples of comments made from Children 1 and 2 included, "pumpkin", "it's a mouse!", "it's a cat", "meow", "owl.. hooo!" and "wow". Based on the objective observations taken during pre-intervention of shared reading activities, Children 1 and 2 demonstrated high interest in literacy, as well as, pre-vocational skills such as attending, staying in the area of instruction and sitting. Children 1 and 2 were able to engage and attend to an entire shared reading activity and respond to and initiate interactions, as demonstrated by their participation through both filling in blanks and commenting on the story. Child 3 was able to sit for approximately 30-40 seconds during shared reading. Child 4 stood in the back of classroom during shared reading activities.

The pre-intervention results concluded that Children 1 and 2, demonstrated pre-vocational skills such as sitting and attending, as well as, pre-literacy skills

and engagement in literacy activities such as commenting and filling in the blanks. Children 3 and 4 demonstrated a need for support in pre-vocational skills of sitting and staying in the area of instruction. They demonstrated intermittent attention to shared reading activities when at circle time and did not initiate or respond to bids for interactions.

Pre-Intervention Brigance Inventory of Early Development III (IED III)

Based on the Brigance Inventory of Early Development III (IED III), a criterion-referenced assessment tool, in the area of pre-literacy, Children 1 and 2 demonstrated scattered skills up to 4.0 years of age because they could: "attend for 3–5 minutes", turn a book right side up, make comments about stories, try "to read books from memory", sing songs, point to pictures and "has several favorite books" (Brigance, 2013: 21). Children 3 and 4 demonstrated skills up to 1.1 years of age because they could: "turn a picture book right side up" and attempt "to turn pages" but did not yet demonstrate the following pre-literacy skills, "attend for 3–5 minutes", point to pictures, demonstrate interest in "read to-me books", talk about characters or events, ask questions and make comments (Brigance, 2013, p. 21). The results concluded that prior to intervention participants demonstrate scattered skills between the developmental ages of 1.1 years of age and 4.0 years of age.

Post-Intervention Emergent Literacy Skills Checklist and Emergent Literacy Rating Scale

Post intervention implementation, the emergent literacy skills checklist and the emergent literacy rating scales were completed for the four children. Based on data gathered from the emergent literacy skills checklist, Children 1 and 2 continued to participate and engage in literacy activities through, responding with one or two-words, pointing to pictures in a book, repeating known aspects of a story, labeling items, commenting on stories and looking for preferred pictures but continued to not yet demonstrate the ability to re-tell, understand characters or events or ask questions about stories (California Department of Education, 2015; McCan, 2016). However, post-intervention, Children 1 & 2 included signs within their responses, comments and requests. Children 3 and 4 continued to demonstrate the ability to explore books and prefer certain stories but did not demonstrate new skills in the area of, pointing to pictures or labeling items in the story (California Department of Education, 2015; McCan, 2016). Results of the checklist conclude, that participation and engagement in literacy activities, that were included in the emergent literacy checklist did not change post-intervention. Therefore, when signs were incorporated in early literacy activities, specifically, story time, engagement was not affected.

The post-intervention results for the emergent literacy rating scale showed some improvement in the frequency on student initiations and responses to bids for in-

teractions. Child 4 had pre-intervention scores of zero for initiation and response and post-intervention demonstrated 1–2 responses. Child 4 increased their responses during shared reading from 0 times to 1 or 2 times. The frequency in which children initiated and responded to bids for interactions were not impacted when sign language was embedded for Child 1, 2 and 3. However, responses to bids for interactions were impacted when sign language was embedded for Child 4, as the frequency in which they responded increased.

Post-Intervention Participant Observation and Field Notes

The four children participating in the study were assessed post-intervention through observation, including both objective and reflective notes. The purpose of this tool was to gather specific examples of how children initiated and responded to bids for interaction, as well as, generalization of skills learned across environments and settings.

Children 1 and 2 continued to demonstrate pre-vocational skills such as sitting, attending and staying in the area of instruction. The need for redirection decreased to zero or one time during the shared reading activity. They also continued to respond to bids for interaction through filling in the blanks during shared reading. For example, during shared reading, students were taught signs for core words, including "open", "more" and "go". On each page, the teacher stated, "1, 2, 3, open!" prior to lifting the flap to reveal the animal or item behind the flap. When the teacher started the phrase to prompt student communication by saying, "1.." and then pausing, Children 1 and 2 responded by filling in the blank "1, 2, 3, open!". Post-intervention, both Children 1 and 2 utilized the sign for "open"" as they filled in the blanks each time. Child 1 independently initiated an interaction through utilizing the sign for "open" three times per shared reading activity to request for the teacher to lift the flap, prior to the teacher prompting communication. Post-intervention, Child 2 was observed to utilize the sign for "more" in additional settings to supplement communication. For example, during centers, Child 2 wanted more stickers and independently used the sign "more" in addition to verbally requesting "more" to request. Children were taught fringe words related to the story being read such as the sign for animals in the books (e.g. cat and fish). Child1 utilized signs for fringe words independently during shared reading to initiate a comment and Child 2 imitated the signs for the fringe words taught during shared reading, however, they were not observed to utilize these signs outside of the shared reading activity.

During the post-intervention period, Children 3 and 4 stayed in the area of instruction for the duration of a shared reading activity with support from a paraprofessional. Child 3 was not observed to initiate or respond to bids for interaction, imitate or attempt signs taught during shared reading. Child 3 was, however, observed to respond to prompts to communicate with the sign for "more" outside of shared reading activities. For example, while engaging in a play activity with a ball drop toy,

Child 3 led the teacher's hand to a ball and put it on top of the structure. The teacher verbally stated "more" and modeled the sign for "more" simultaneously. At the end of the intervention period, Child 3 responded by attempting to imitate the sign through moving his two hands together after given one model prompt which decreased from requiring approximately three model prompts throughout intervention. Child 4 responded to bids for interaction during shared reading through smiling, looking at the researcher or moving hands in response to modeling of a sign by the researcher. Both children continued to benefit from one to one adult support during shared reading.

Post- Intervention Brigance Inventory of Early Development III (IED III)

The four children participating in this study were also re-assessed through participating in the Brigance Inventory of Early Development III (IED III). In the area of pre-literacy, Children 1 and 2 continued to demonstrated the same scattered skills up to 4.0 years of age as in the pre-intervention assessment (Brigance, 2013). Children 3 and 4 continued to demonstrate skills up to 1.1 years of age. Results conclude that participation and engagement in literacy activities, that were included in the Brigance Inventory of Early Development III did not change for all children post-intervention.

DISCUSSION

The results conclude that all four children who participated were impacted by the intervention, in different ways. Child 1 easily embedded signs within their communications and interactions during shared reading and began utilizing them independently to initiate during this activity. Child 2 generalized the sign for the core word "more" to other settings outside of shared reading for the purpose of requesting. Children 3 and 4 stayed in the area of instruction during and post-intervention. Additionally, Child 3 responded to prompts to communicate with the sign "more" with less prompts outside of the shared reading context, during play. Lastly, Child 4, increased their responses to bids for interaction from 0 times to 1–2 times.

Additionally, results concluded, consistent with existing documentation, when taught core words in sign language, these words were more likely to be generalized than fringe vocabulary, to other settings and for communicative functions such as requesting (Beukelman & Mirenda, 2005, as cited in Tan et al., 2014; Geist, 2020; Ogletree, 2021, Tan et al., 2014).

The intervention had an effect on all four children, although each in different ways. Assessment for impacts of intervention was best measured through observations, as this data demonstrated the wide range of impact the intervention had on participants during shared reading activities and within other settings. Post-intervention, Children 1 and 2 initiations and responses during shared reading included signs. However, the use of the sign for the core word "more" was generalized to other settings to support communication for Child 2. For Child 1 and Child 2, incorporating signs in early lit-

eracy activities did not affect the frequency in which they initiated and responded to bids for interactions, however, it did affect how they engaged in story time, as Child 1 initiated and responded to bids for interactions using signs post-intervention with the teacher/researcher during story time and Child 2 used signs for responses to bids for interactions with the teacher/researcher during shared reading.

Children 3 and 4 demonstrated an increase in pre-vocational skills, such as staying in the area of instruction, during intervention. Pre-literacy skills and participation and engagement in literacy activities addressed in the Brigance Inventory of Early Development III (IED III), emergent literacy rating scale and in the emergent literacy skills checklist did not change post-intervention for Child 3. However, participant observations and field notes revealed that Child 3 responded to prompts to communicate with the sign "more" in a play setting with less prompting at the end of the intervention period. Therefore, for Child 3 incorporating signs in early literacy activities did not affect the frequency in which they initiated and responded to bids for interactions and did not impact how they engaged in early literacy activities, specifically story time. Child 4's responses to bids for interactions increased from 0 times to 1-2 times during intervention. Therefore, for Child 4, incorporating signs in early literacy activities did not affect their engagement in early literacy activities. However, when signs were embedded, their responses to bids for interactions were impacted, as demonstrated through an increase in frequency.

Results of the study found that embedding sign language within early literacy activities in an early childhood classroom can have an impact on student learning and development in a variety of ways and can impact each individual differently. Each child demonstrated various skills post-intervention. Although engagement in early literacy activities and initiations and responses to bids for interactions did not change pre and post-intervention for Child 1 and 2, Child 1 learned signs and independently utilized them during shared reading and Child 2 generalized the sign for the core word "more" to other settings. Additionally, although engagement in early literacy activities and initiations and responses to bids for interactions did not change for Child 3, their pre-vocational skills increased and they responded to prompts to communicate with the sign "more" with less prompts outside of a shared reading activity. Lastly, responses to bids for interactions were impacted for Child 4, as their responses to bids for interactions during shared reading increased from 0 times to 1 or 2 times.

Children who participated in this study may have responded differently to sign language being embedded within early literacy activities based on the skills that they had prior to intervention. For example, children who already demonstrated pre-vocational skills such as staying in the area of instruction and skills such as initiating and responding pre-intervention, added a new skill to their repertoire and used signs in their initiations and responses. On the other hand, children who did not already demonstrate pre-vocational skills such as staying in the area of instruction pre-intervention, demonstrated an increase in these skills during intervention for example.

Pre-Intervention

Input	Output
Early literacy activities embedded within the school day.	Children 1 and 2: initiated communication and responded to bids for interactions at least 4 times during shared reading; demonstrated pre-vocational skills such as sitting and attending, as well as, pre-literacy skills and engagement in literacy activities such as commenting and filling in the blanks; demonstrated scattered skills up to 4.0 years of age because they could: "attend for 3–5 minutes", turn a book right side up, make comments about stories, try "to read books from memory", sing songs, point to pictures and "has several favorite books" (Brigance, 2013: 21). Children 3 and 4: did not initiate communication and respond to bids for interaction during shared reading; demonstrated a need for support in pre-vocational skills of sitting and staying in the area of instruction; demonstrated skills up to 1.1 years of age because they could: "turn a picture book right side up" and attempt "to turn pages" but did not yet demonstrate the following pre-literacy skills, "attend for 3-5 minutes", point to pictures, demonstrate interest in "read to-me books", talk about characters or events, ask questions and make comments (Brigance, 2013: 21).

Post-Intervention

Input	Output
Early literacy activities embedded within the school day. Sign language embedded within early literacy activities, specifically story time.	Child 1: The frequency in which they initiated and responded to bids for interactions were not impacted when sign language was embedded; continued to demonstrate pre-vocational skills such as sitting, attending and staying in the area of instruction; utilized the sign for "open"" as they filled in the blanks each time; utilized signs for fringe words independently during shared reading to initiate a comment; independently initiated an interaction through utilizing the sign for "open" three times per shared reading activity to request for the teacher to lift the flap, prior to the teacher prompting communication; continued to demonstrated the same scattered skills up to 4.0 years of age as in the pre-intervention assessment (Brigance, 2013)

Input Output

Child 2: The frequency in which they initiated and responded to bids for interactions were not impacted when sign language was embedded; continued to demonstrate pre-vocational skills such as sitting, attending and staying in the area of instruction; utilized the sign for "open" as they filled in the blanks each time; observed to utilize the sign for "more" in additional settings to supplement communication; imitated the signs for the fringe words taught during shared reading, however, they were not observed to utilize these signs outside of the shared reading activity; continued to demonstrated the same scattered skills up to 4.0 years of age as in the pre-intervention assessment (Brigance, 2013)

Child 3: The frequency in which they initiated and responded to bids for interactions were not impacted when sign language was embedded; stayed in the area of instruction for the duration of a shared reading activity with support from a paraprofessional; responded by attempting to imitate the sign through moving his two hands together after given one model prompt which decreased from requiring approximately three model prompts throughout intervention;); continued to demonstrate skills up to 1.1 years of age (Brigance, 2013).

Child 4: Increased their responses during shared reading from 0 times to 1 or 2 times; stayed in the area of instruction for the duration of a shared reading activity with support from a paraprofessional; continued to demonstrate skills up to 1.1 years of age (Brigance, 2013).

Implications

Embedding sign language within early literacy activities may have multiple benefits and support student learning and development in a wide variety of ways. Children who demonstrated pre-vocational skills, such as attending and staying in the area of instruction, as well as, demonstrated engagement in early literacy activities through initiating comments and responding to bids for interactions through filling in the blanks, prior to intervention, continued doing so after. It is important to note that they embedded signs within their communication during

shared reading post- intervention. However, additional engagement in pre-literacy skills were not impacted. Child 2, who engaged in pre-literacy activities and demonstrated the above pre-vocational skills prior to intervention, generalized the sign for the core word, "more" within two weeks of intervention to other settings for the purpose of requesting. This finding is consistent with existing documentation on core vocabulary, as these words are more likely to be generalized than fringe vocabulary, to other settings (Beukelman & Mirenda, 2005, as cited in Tan et al., 2014; Geist, 2020; Ogletree, 2021, Tan et al., 2014). It is also consistent with existing research which found that three preschool students with autism acquired signs after being introduced to Key Word Sign and generalized some signs learned (Tan et al., 2014). Engagement in pre-literacy skills and activities were not impacted for Child 3, however, core words taught in sign were utilized in other settings with less prompting. Responses to bids for interactions increased for Child 4 during intervention.

Therefore, data gathered shows that pre-vocational skills, such as sitting and attending, may be a skill that enhances learning for this intervention. More importantly, data gathered implies that this intervention may be an important tool for teachers in providing children with another way to communicate, interact and participate in shared reading, aligned with the UDL framework (Horn & Banerjee, 2009; Smith et al., 2018). Additionally, data gathered shows, this intervention has potential for supporting generalization and communication in other contexts and settings in the school day, for communicative functions such as requesting. However, data gathered shows that each student may respond to this intervention in different ways and gain different skills.

Limitations

While data gathered showed multiple different benefits across the participants, there are limitations that are important to note. The study was implemented at the beginning of a school year, where students were experiencing an abundance of change simultaneously. Additionally, the classroom was experiencing frequent inconsistent staffing. Therefore, this had an impact on a variety of factors such as, behavior and regulation which in turn can affect pre-vocational skills such as attending. For example, at the beginning of the study Children 3 and 4 were working on pre-vocational skills and regulating, whereas towards the end of the study both children were able to stay in the area of instruction during shared reading. However, multiple factors could have impacted this change as well. For example, less children were present within the intervention period than prior to the intervention and towards the end of the intervention period, there was more frequent consistent staff in the classroom. Therefore, additional time and data would be beneficial in gathering a deeper understanding of the impact embedding sign language in early literacy activities has on children.

Future Research

Future research would benefit from teaching all staff in the room the signs that were going to be taught during shared reading and ensure that they are comfortable using signs prior to intervention. Throughout the majority of the current study, the classroom experienced inconsistent staffing with frequent new staff each day so this was not feasible. Additionally, future research would benefit from embedding sign language within early literacy activities for an extended period of time, which would allow considering other factors that could impact effectiveness, including adjustment periods, regression, regulation skills and pre-vocational skills. This would also allow for longer exposure to learn a new skill which could in turn impact effectiveness. Lastly, future research could focus on the development and effectiveness of a type of curriculum based on this intervention. The curriculum would include pre-chosen stories and signs for themes taught throughout an entire school year, enhancing the core and fringe vocabulary words taught to students.

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