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The Effectiveness of Oculomotor Rehabilitation on Impaired Reading Skills: A Case Study Approach

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Abstract

Research suggests that oculomotor dysfunctions, such as convergence insufficiency, impact children's ability to read and write. Studies have identified convergence insufficiencies in near 6.8% of school-aged children. Oculomotor dysfunctions, such as convergence insufficiency, have responded favorably to oculomotor rehabilitation once identified. This case study discusses the identification of an oculomotor dysfunction, treatment, and outcome for a 10 year-old who participated in a Title One reading program at their school as well as comparative Individualized Education Plan findings. This case study supports the effectiveness of oculomotor rehabilitation treatment in addressing oculomotor dysfunctions that may impact a child's ability to read and write as well as the value of oculomotor screening in addition to a traditional eye examination.

Keywords: convergence insufficiency, reading skills, literacy

The Effectiveness of Oculomotor Rehabilitation on Impaired Reading Skills: A Case Study Approach

Background

Convergence insufficiency (CI) is a type of binocular vision dysfunction in which an individual has difficulty converging accurately or sustaining convergence when focusing on near objects (Nunes, Monteiro, Ferreira, & Nunes, 2019). Symptoms of convergence insufficiency include eye strain, headaches, problems reading including re-reading lines of text, and words appearing to move on the page (Davis et al., 2016). Studies of school-age children have found a prevalence of convergence insufficiency at 6.2 to 6.8% (Davis et al., 2016; Nunes et al., 2019). Overall, research suggests that convergence insufficiency occurs in the general population at an approximate rate of five percent (Nunes et al., 2019). Muzaliha et al. (2012) found the prevalence of convergence insufficiency in children with learning disabilities at 14%.

Dusek, Pierscionek, and McClelland (2010) investigated visual function in school-aged children aged six to 14 years old with reading and writing difficulties and found that 18.2% of the referred children exhibited convergence insufficiency. Hirota et al. (2016) found that individuals with convergence insufficiency-type intermittent exotropia re-read the same line 4.9 times as compared to controls at 0.2 times. Quaid and Simpson (2013) investigated reading speed and

oculomotor function in children aged six to 16 with reading difficulties and had an individualized education plan (IEP). The authors found that there was a significant difference between the IEP group and non-IEP group for vergence facility ($p<0.001$) and reading speed ($p<0.001$) as well as significant correlation between vergence facility and reading speed (Quaid & Simpson, 2013). Therefore, research supports the need for a comprehensive binocular vision evaluation in addition to a traditional eye examination in students with reading difficulties (Palomo-Alvarez & Puell, 2010; Quaid & Simpson, 2013).

Convergence insufficiency has been found to be effectively treated with oculomotor rehabilitation (Aletaha, Daneshvar, Mosallaei, Bagheri, & Reza-Khalili, 2018; Dusek, Pierscionek, & McClelland, 2011; Jang, Jang, Tai-hyung, & Moon, 2017; Rawstron, Burley, & Elder, 2005). Aletaha, Daneshvar, Mosallaei, Bagheri, and Reza-Khalili (2018) found that augmented office-based treatment that included diopter use, a type of reading lens, and base-out prism use, a lens used to facilitate binocular vision, while reading showed greater effectiveness in the treatment of convergence insufficiency at six months as compared to solely home-based treatment or office-based treatment of orthoptic therapy. Effective oculomotor rehabilitation was found to include 60-minute treatment sessions, two to three times per week (Aletaha et al., 2018; Jang et al., 2017). Oculomotor rehabilitation may include brock string exercises, an exercise that consists of a string that is held to the student's nose at one end and to a doorknob at the other end, with specifically placed beads along the string; eye saccade exercises, which include reading letters and numbers in directed patterns; ocular tracking exercises, which include following targets using one eye at a time and then both eyes together; a ball toss with letters, where an individual catches a soccer ball that has printed letters and searches for the letter as called out by the treating therapist; smiley card, where an individual uses an index card placed to their nose and approximates two circles, one circle with two eyes and one circle with a mouth, into one, thus creating a face; aperture, a piece of ocular equipment designed to improve convergence by bringing pictures together; pencil push-ups, an individual follows a pencil toward their nose until the image splits into two images and then slowly moves the pencil away from their nose until the image returns to one image; and vectograms, a 3D ocular exercise used to facilitate convergence and depth perception (Huffine & Christy, 2018).

Methodology

Research Design

Our research team employed a case study design to explore the implementation of oculomotor rehabilitation with a struggling reader. Case study is useful methodology for investigating a particular phenomenon in a real-world context (Yin, 2014). This methodology was chosen so we could carefully examine the phenomenon of oculomotor rehabilitation and describe the single participant's literacy development that occurred during the rehabilitation.

Participant

A ten year-old participant's history included below average reading skills, loss of place with reading, distracted easily in school, and participation in the Title One reading program at their school. The participant's parents enrolled the participant in an afterschool tutoring program offered through the Literacy Center of a local university. The hour-long weekly tutoring sessions provided supplemental instruction in reading and writing, based on diagnostic assessments of literacy development.

The participant was assessed as part of an oculomotor screening session offered by the first author at the Literacy Center. The participant's ocular findings were suspect of convergence insufficiency. This resulted in a recommendation to the participant's parents that they follow-up with an optometrist who specializes in binocular vision disorders. The names of two local optometrists who met such qualifications were provided to the parents, who then followed through by arranging an appointment.

Context and Procedures

The study took place at an out-patient rehabilitation center that treats oculomotor dysfunctions located in a rural region of a Mid-Atlantic state.

After being examined by an optometrist who specializes in binocular vision disorders, the participant was found to have poor tracking of a near target when following an "H" pattern, off target eye movement when given two targets to transition gaze between, and the inability to follow a near point target to their nose. The participant's uncorrected vision was 20/40 in their right eye and 20/30 in their left eye at distance. The participant's examination findings determined oculomotor dysfunction. In addition, the participant had a loss of target multiple times when examining oculomotor pursuits, and the participant would overshoot the target with oculomotor saccadic eye movement testing. The examination findings also included convergence insufficiency, the participant was unable to converge their eyes to their nose when following a target and reported double vision at approximately four to five inches from their nose with repetition. The participant was slightly myopic and had an astigmatism. The participant's glasses prescription was slightly modified to provide the best corrected vision of 20/20 right and 20/20 left.

Based on the optometrist's findings, recommendations were made to the participant's pediatrician for oculomotor rehabilitation. The participant underwent clinic-based oculomotor rehabilitation two times per week for 12 weeks and then one time per week for four weeks, totaling 28 treatment sessions. Each treatment session was 60 minutes in length. Initially, treatment over the first three weeks included the brock string, eye saccade exercises, and ocularmotor tracking exercises. Treatment then progressed to include a ball toss with letters, smiley card, aperture, and a red/green vectogram. Pencil push-ups were added at week six. The participant's home exercise program consisted of the brock string and alphabet saccades to be performed up to two times per day for one minute each; smiley card to be performed up to two times per day and holding each face for 10 seconds only; tracking exercises to be performed daily as progressed from the supine position, to sitting, and then to standing, for 10 repetitions each both horizontally and vertically; and pencil push-ups for five repetitions up to two times per day.

Optometry evaluations occurred every six to eight weeks to evaluate progress and modify the oculomotor rehabilitation program. Due to COVID-19 precautions, the participant did not receive additional literacy tutoring sessions, as the Literacy Center was closed.

Data Sources

Oculomotor Function. Oculomotor functional data including tracking performance and convergence was collected through the evaluation of optometry visit notes and included the optometrist's initial evaluation of the participant and each follow-up assessment visit note that occurred every six to eight weeks. Oculomotor rehabilitation data was gathered through the electronic medical records of the physical therapy clinic that specializes in oculomotor rehabilitation, AthenaHealth.

Literacy Development. Growth in reading development was collected through the participant's parents, who shared the participant's Individualized Education Plan (IEP) from the proceeding school-year term evaluation and the current evaluation that occurred two weeks post discharge from oculomotor rehabilitation, a well as a phone interview with the participant's parent. The IEP included results from the Qualitative Reading Inventory (QRI) (Leslie & Schudt-Caldwell, 2017), which was administered by their learning support instructor at their school. The QRI is an informal reading inventory, comprised of graded word lists and text passages. It is a commonly used assessment instrument designed to assess a student's oral reading accuracy, rate of reading, and comprehension.

Data Analysis

The student's medical records, both optometry and oculomotor rehabilitation, were analyzed in sequence from initial evaluation through discharge to track the participant's progress in oculomotor function. Optometry medical records were assessed for the participant's progress beginning at their initial visit and compared to each follow-up visit through to their discharge visit from optometry. The participant's progress in oculomotor rehabilitation was tracked each treatment visit on the participant's gym sheet. The participant's IEP listed literacy performance and progression were charted and compared between each school term's assessment. The student underwent their annual IEP for the current school year approximately two weeks after completing oculomotor rehabilitation.

Results

Upon completion of the oculomotor rehabilitation program, the participant's pursuits and saccades were improved and the participant was within normal range for near point of convergence.

The participant was administered the QRI (Leslie & Schudt-Caldwell, 2017) as part of their IEP by their learning support instructor to assess reading fluency, accuracy, and comprehension. The student demonstrated reading a Level 2 passage at 62.8 words per minute on assessment as compared to the previous school year's baseline of 56 words per minute on a Level 1 passage. The student demonstrated reading a Level 2 passage at 58.3 correct words per minute as compared to the previous school year's baseline of 51.9 correct words per minute on a Level 1 passage. The student was assessed at reading the Level 2 passage with 93% accuracy and answered comprehension questions with 100% accuracy. The student's quality of writing also improved from 76% accuracy to 79% accuracy.

The parental interview clarified the yearly IEP occurred every fall semester, traditionally in November. The next IEP is scheduled for November 2021. The participant's schooling was transitioned to on-line learning from March 2020 through June 2020, due to the pandemic. The participant was able to attend in-person classes five days per week beginning with the Fall 2020 semester and completing the 2020/2021 school year in-person. The parental interview also confirmed that no other supplemental literacy support/program was sought in place of the Literacy Center being closed due to the pandemic, only the Title One reading program at their school as previously established.

Discussion

This student was enrolled in a Title One reading program at their school and the identification of this participant's convergence insufficiency supports current research suggesting the prevalence of convergence insufficiency in students with learning disabilities as well as those students with reading and writing challenges (Dusek, Pierscionek, & McClelland, 2010; Hirota et al., 2016; Muzaliha et al., 2012).

Quaid and Simpson (2013) also found a significant difference between their IEP group and non-IEP group for vergence facility and reading speed which is mirrored by the success of this participant with near point of convergence returning to within normal range with oculomotor rehabilitation treatment as well as reading speed increasing from 56 words per minute on a Level 1 passage to 62.8 words per minute on a Level 2 passage. The participant also improved on their words correct per minute.

Therefore, oculomotor screening and a comprehensive binocular vision examination may be a supportive addition to a traditional eye examination in students with reading and writing challenges as well as learning disabilities (Palomo-Alvarez & Puell, 2010; Quaid & Simpson, 2013). The identification and treatment of oculomotor dysfunctions aids not only in the improvement of oculomotor function but potentially academic success as well.

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Preliminary Evaluation of a Community-Based Parent Mentor Program: Empowering Families to Navigate Special Education

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Abstract

Parent-to-Parent individualized mentoring is an understudied strategy that has potential for supporting parents of children with disabilities as they learn to navigate the special educational planning process. Preliminary findings from a formative evaluation of individualized, intensive parent-to-parent mentoring services are shared. Data were collected from a pre-post Family Empowerment Scale survey, as well as an open-ended questionnaire for school professionals. While significant increases in parent empowerment were achieved, analysis of data from school professionals uncovered critical questions that are important for the field to explore further.

Keywords: parent mentoring, special education, family empowerment, evaluation research

Preliminary Evaluation of a Community-Based Parent Mentor Program: Empowering Families to Navigate Special Education

Broadly, parent involvement in education has been linked to a variety of positive social, emotional and academic growth outcomes (Barnard, 2004; Epstein & Sanders, 2000; Fan & Chen, 2001; Green, et al., 2007; Grundmeyer & Yankey, 2016; Henderson & Mapp, 2002; Hill & Tyson, 2009; Jeynes, 2003). As a result, schools and school districts across the country are shifting towards making parent involvement an integral part of reform efforts (Mapp & Kuttner, 2013). Decades of research have identified a variety of strategies to help engage parents (Epstein et al., 2018) and to motivate families to become involved in their child's education (Hoover-Demsey & Sandler, 1995, 2005; Institute, 2012). However, the existing research related to strategies encouraging parent involvement in schools has largely been focused on families without students with disabilities.

Families of children with disabilities may require more support and individualized attention to become involved than parents of typically developing children (Fishman & Nickerson, 2015). Historically, parents of students with disabilities have faced greater barriers to involvement, and are generally less involved in schools than parents of typically developing children (Coots, 1998; Dyson, 1997). Although it is unclear exactly why they are less involved, it may be that the role parents of children with disabilities are expected to have in the educational planning of their child is markedly different from the role of other parents (Dunst & Dempsey 2007; Murray, et al., 2013).

Family Involvement and Special Education

Parent involvement (or parent participation) in schools is a key pillar of special education legislation in the United States. The Individuals with Disabilities Education Improvement Act (IDEIA, 2004) mandates parent participation in the educational planning for children with special educational needs. The Individualized Education Program (IEP) document, which outlines the child's educational goals and the specific services and accommodations that will be provided to meet student goals, must be developed in collaboration with parents. However, parents are rarely supported in ways that allow them to participate meaningfully (e.g., Ilik & Er, 2019). Meaningful parent involvement in IEP planning requires an in depth understanding of the special education system, which includes specific knowledge of the special education processes, legal rights, available services, and shared responsibilities (Leiter & Krauss, 2004). In a recent qualitative study, Ilik and Er (2019) found that most parents lacked a basic understanding of the IEP process and were not even invited to participate in the IEP meeting by the school. Their study also found that school professionals perceived it to be hard to gain parent participation in the IEP process, yet they lacked knowledge regarding how to actually go about supporting parent participation in the special education planning process.

It is well-documented that the special education planning process is overwhelming for many parents for a variety of reasons. For example, Mandic and colleagues (2012) noted that special education materials often presented to parents exceed the reading skills of most parents. In addition, instead of feeling like a partner in the planning process, with equal power (National Parent Teacher Association, 2012), many parents report feeling as if they are at a disadvantage and even feel intimidated when communicating with school professionals (Esquivel, et al., 2008; Mereoiu et al., 2016; Zeitlin & Curcic, 2014). Research suggests this may be due to the fact that parents are mandated by federal law to be at IEP planning meetings with multiple school professionals, where placements and other educational decisions are already made for them (Fish, 2006; Ruppar & Gaffney, 2011).

A parent's role in the education of a child with a disability is unique. In fact, Dunst and Dempsey (2007) propose that "the role of parents with a child with a disability shows a level of complexity and intensity not generally found in the general population" (p. 305). Given the challenges families encounter and the fact that many IEPs fall short of legal requirements due to inadequacies, including limited evaluation of the child's needs or inadequate classroom placement or services (Ruble et al., 2010), it is imperative that families be supported in ways that help them learn the skills they need to meaningfully participate in the special education planning process. Parent-to-Parent individualized mentoring is one strategy implemented and studied outside the field of education (e.g. Berrick et al., 2011; Foster et al., 2015; Villanueva & Foster, 2016) that shows promise for empowering parents by helping them gain the skills they need to navigate the special education system.

The Role of Parent Mentors/ Parent Mentor Programs

Broadly, mentoring is a psychosocial intervention where an individual (mentee) is matched with a more experienced and knowledgeable person (mentor) who is able to provide support, encouragement, and guidance (Ayton & Joss, 2016; Smith, 2011). Parent mentor programs have been implemented and studied outside the field of education for quite some time: for example, parent mentors have been used in interventions aimed at improving childhood asthma control

(Flores et al., 2009), improving successful rates of reunification of children involved with child welfare (Berrick et al., 2011), reducing malnutrition (Le Roux et al., 2010), improving general parenting skills (Johnson et al., 1993), reducing childhood obesity (Villanueva & Foster, 2016: Foster et al., 2015), breaking cycles of generational poverty by addressing social determinants of health (i.e. housing, employment, health, finances, and social support) (Ayton & Joss, 2016), and supporting families of various children with chronic disabling conditions (Mirza et al., 2017). However, parent mentor programs are still understudied as an intervention (or strategy) used by schools or other organizations to support families, especially parents of students with disabilities (e.g., Miller et al., 2017) with specific education related outcomes.

A Community-Based Parent Mentor Program

In January 2019, a statewide family-serving community organization launched an individualized, intensive parent-to-parent mentoring component to their existing parent mentor services. This organization has been serving families of children and youth with disabilities for over 35 years, as well as professionals in the fields of health and education. More specifically, the mission of the organization is to encourage, educate, and empower families to be effective advocates for their children. The organization receives funding from a variety of federal and state grants, contracts, as well as individual and corporate donations. It is also the sole organization in their state designated as the Parent Training and Information Center by the U.S. Department of Education, Office of Special Education Programs, which provides educational resources to parents whose children receive special education services. In addition, they are also the only organization in the state to be designated as a Family-to-Family Health Information and Education Center by the U.S. Department of Health and Human Services, which provides health-related educational resources to parents who have children with special health care needs. Programs and services are offered at no cost to families, and are available in English and Spanish. Their outreach through newsletters and website reaches more than 15,000 families, educational professionals, and health professionals each year.

In October 2018, this family-serving organization was awarded a small local grant that made it feasible to launch an individualized, intensive parent-to-parent mentoring component to their existing parent mentor services. More specifically, the grant funded three new part-time mentors who were given the title IEP Parent Mentors.

The stated goal of IEP Parent Mentor services in terms of family outcomes is to *empower families to feel confident when participating in the educational planning for their child*. During the first year of implementation, an independent evaluation team conducted a preliminary formative evaluation of services. The following evaluation questions guided the evaluation team's data collection and analysis efforts:

1. To what extent do families who received IEP Parent Mentor services experience increased levels of empowerment as measured by the Family Empowerment Scale (FES)?

2. How do school professionals perceive the services of the IEP Parent Mentor contributing to family outcomes?

Method

Both quantitative and qualitative data were collected as part of the formative evaluation of the IEP Parent Mentor services. Data collection began when IEP Parent Mentor services started (January 15th, 2019) and ended on October 6th, 2019, which was the end of the first grant cycle.

To answer evaluation question #1, a single group, pre-posttest design was used to determine the extent to which families who received IEP Parent Mentor services experienced increased levels of empowerment. More specifically, the Family Empowerment Scale (FES) (Koren et al., 1992) was administered electronically at the following two time points: 1) referral to IEP Parent Mentor services; and 2) just after the follow up meeting with the IEP Parent Mentor. In order to facilitate matching and maintain confidentiality, IEP Parent Mentors were assigned a unique family identification number (Family ID) when families consented for services. IEP Parent Mentors uploaded completed consent forms to Qualtrics, which served as notification to program evaluators that families were ready to be sent the pre-FES survey via email. Similarly, IEP Parent Mentors entered the family ID into Qualtrics again just after the follow-up meeting to indicate that the family was ready to be sent the post-survey.

The FES (Koren et al., 1992) is a 34-item rating scale that was developed to measure empowerment in families of children and youth with disabilities (Vuorenmaa et al., 2013). The framework of the questionnaire consists of two dimensions. The first dimension reflects three levels of empowerment: 1) Family, that is, the immediate situation at home and involves the parent's management of day-to-day situations; 2) Service System, that is, professionals and agencies that provide services to the parent's own child and primarily involves the parent's actively working with the service system to get services that are needed by his or her child; 3) Community/Political, that is, legislative bodies, policy makers, agencies, and community members who are concerned with or who influence services for children and their families. Only the Family and Service System sub-scale scores of the FES were used for the present evaluation study, which yielded a total of 24 questions that were used on both the pre and post FES measures (see Table 1). The second dimension of the FES reflects the expression of empowerment: 1) attitudes, what a parent feels and believes; 2) knowledge, what a parent knows and can potentially do; 3) behaviors, what a parent actually does. These types of expressions can occur within both the Family and the Service System levels of empowerment that were used for this evaluation. Responses fall on a five-point Likert scale ranging from *Not True at All* to *Very True*. The FES has strong psychometric properties that have been extensively studied; in addition, the FES has been successfully used in studies involving families of children with emotional and behavioral disorders (Curtis & Singh, 1996), Juvenile Diabetes (Florian & Elad, 1998), and developmental disabilities (Thompson et al., 1997; Dempsey & Dunst, 2004).

Pre-post FES survey data were entered into SPSS statistical software for analysis. A series of Wilcoxan sign tests were conducted to determine the extent to which families who received IEP Parent Mentor services experienced increased levels of empowerment as measured by the Family Empowerment Scale. The Wilcoxon sign test is the non-parametric alternative of the dependent samples t-test. This approach is appropriate because it has been shown to be the best test to compare mean scores when the dependent variable is not normally distributed (Roberson et al., 1995).

Table 1
Pre-Post Family Empowerment Scale (FES) and Questionnaire

1. Family ID ____
2. Pre _____ Post_____
3. I feel that I have a right to approve all services my child receives.
4. When problems arise with my child, I handle them pretty well.
5. I know the steps to take when I am concerned my child is receiving poor services.
6. I make sure that professionals understand my opinions about what services my child needs.
7. I feel confident in my ability to help my child grow and develop.
8. I know what to do when problem arise with my child.
9. I feel my family life is under control.
10. I am able to make good decisions about what educational services my child needs.
11. I am able to work with agencies and school professionals to decide what services my child needs.
12. I make sure I stay in regular contact with school professionals who are providing services to my child.
13. I am able to get information to help me better understand my child.
14. My opinion is just as important as professionals' opinions in deciding what services my child needs.
15. I tell professionals what I think about services being provided to my child.
16. I believe I can solve problems with my child when they happen.
17. I know what services, including educational services, that my child needs.
18. When I need help with problems in my family, I am able to ask for help from others.
19. I make efforts to learn new ways to help my child grow and develop.
20. When necessary, I take the initiative in looking for services for my child and family.
21. When dealing with my child, I focus on the good things as well as the problems.
22. I have a good understanding of the services system that my child is involved in.
23. When faced with a problem involving my child, I decide what to do and then do it.
24. Professionals should ask me what services I want for my child.
25. I have a good understanding of my child's disorders or disability.
26. I feel I am a good parent.

To answer evaluation question #2, an electronic open-ended questionnaire was created by the evaluation team to explore school professionals' perceptions related to how IEP Parent Mentor services contributed to family outcomes (see Table 2). The electronic questionnaire was sent to all school professionals who participated in IEP team meetings where there was an IEP Parent Mentor present with the parent. Within 24 hours of the IEP team meeting, the IEP Parent Mentor entered the following information into Qualtrics, which was immediately accessible to evaluators: 1) unique family identification number, 2) name of the school, 2) school district, 3) city, and 4) IEP team member names (and email addresses**,** if known). The evaluation team used the information entered into Qualtrics to recruit participation. Each school professional was sent a recruitment email asking them to participate by completing the electronic open-ended questionnaire. A link to the questionnaire was provided in the recruitment email. In order to attempt to gather data while participants were best able to remember important aspects of

meeting interactions, recruitment emails were sent to school professionals the same day that the evaluation team received contact information.

Completed questionnaires were analyzed using a content analysis approach. Qualitative content analysis is defined as a method for "the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns" (Hsieh & Shannon, 2005, p. 1278). Answers to questions were analyzed using line by line analysis, allowing for categories, subcategories and themes to inductively emerge. Both evaluators met regularly to discuss discrepancies that emerged from independent efforts and continued to meet until they came to full agreement about the coding. Moreover, the analysis process was iterative and continued until no new information emerged from the data.

Table 2
Questionnaire for School Professionals

1. What is your role on the IEP team for this child/youth? (e.g. general education teacher, special education teacher, administrator, school psychological, etc..)
2. Have you worked with this family before on an IEP team? (yes/no) If yes, how long? ___
3. Did you know that the family would be bringing an IEP mentor to the IEP meeting? (yes/no)
4. Are you familiar with the LifeCourse Framework? (yes/no)
5. Prior to the meeting, did you know that the family had received training about IDEA, the IEP planning process, and planning using the LifeCourse Tools? (yes/no) If so, how did knowing this affect your preparation for the meeting?
6. Describe the interaction between the IEP Mentor and the Parent during the IEP meeting.
7. Describe the interactions between the IEP Mentor and other IEP team members.
8. Describe the interactions between the Parent and other IEP team members.
9. To what extent was your behavior affected by the presence of the IEP Mentor?
10. Describe how you feel the IEP Mentor contributed to the IEP planning and decision making in support of the child/youth.
11. What do you expect of parents in their role as an IEP team member?
12. Would you be willing to participate in a short 10-minute follow up phone interview, if needed? If so, please share your email address.

Results

In the sections that follow, results are organized by each of the questions that guided this preliminary evaluation. Within each section, information is also shared that relates to recruitment, response rates, and resulting sample.

Evaluation Question #1: To what extent do families who received IEP Parent Mentor services experience increased levels of empowerment as measured by the Family Empowerment Scale (FES)?

A total of 39 families agreed to participate in the evaluation study. However, only families who completed both pre and posttest surveys were included in the analysis. A total of 18 families completed both the pre and posttest surveys, which yielded a response rate of approximately 46%.

Sample Characteristics

Table 3 depicts information related to child and family characteristics for the 18 families who completed both the pre and post FES survey. The majority of families (72%) with whom IEP Parent Mentors worked (who also consented to be part of the evaluation study) included at least one biological parent living at home. Descriptive data related to the child who was the focus of the IEP meeting was also collected and analyzed. A total of 83% of children were Caucasian; 72% were male; 56% had a low-incidence disability. The grade level of children of the families in this sample ranged from pre-school to 12th grade. The majority of children in the sample attended a school district located in the state's education districts 1-4, which are located in the northeastern part of the state.

Table 3
Family/Child Characteristics

	n=18	%
Family Structure		
Bio mom only, both bio parents, or bio mom and step-dad	13	72%
Adoptive, other family members, ICF	5	28%
Race of Child		
Caucasian	15	83%
Other	3	17%
Gender of Child		
Male	13	72%
Female	5	28%
Grade of Child	5	28%
Prek-3 (early childhood)	7	39%
4th-8th	6	33%
9th-12th		
SPED Primary Category		
Low-incidence (autism, ID)	10	56%
High incidence (ED, SLP, LD)	8	44%
School District by KSBE District		
KSBE Districts 1, 2, 3 & 4	9	50%
KSBE District 5	5	28%

KSBE District 6	0	0%
KSBE District 7, 8, 9, & 10	4	22%

Pre-Post FES Survey Results

A series of Wilcoxon Sign Tests were conducted to determine the extent to which families who received IEP Parent Mentor services experienced increased levels of empowerment as measured by the Family Empowerment Scale (FES). Results of this test indicated that both the family and service subscale post-FES scores were statistically significantly higher than the family and service subscale pre-FES scores (see Table 4). More specifically, statistically significant differences between pre and post- FES scores were found among seven of the questions that make up the FES family subscale and among nine of the questions that make the FES service subscale. A statistically significant change indicates that the changes in scores from pre to post FES survey administration are likely not to be simply explained by chance, but instead by the IEP Parent Mentor services the family received.

Table 4
Pre-Post FES Survey Results

Question	**Pre-Survey Mean n=18**	**Post-Survey Mean n=18**	***p***
When problems arise with my child, I handle them pretty well	3.89	3.94	.739
I feel confident in my ability to help my child grow and develop.	3.61	4.06	.059
I know what to do when problem arise with my child	3.67	4.17	.003*
I feel my family life is under control	3.89	4.11	.305
I am able to get information to help me better understand my child	3.67	4.39	.012*
I believe I can solve problems with my child when they happen	3.67	4.22	.025*
When I need help with problems in my family, I am able to ask for help from others	3.56	4.22	.008*
I make efforts to learn new ways to help my child grow and develop	4.39	4.61	.157
When dealing with my child, I focus on the good things as well as the problems	4.11	4.61	.024*
When faced with a problem involving my child, I decide what to do and then do it.	3.67	4.33	.002*
I have a good understanding of my child's disorders or disability	3.67	4.50	.002*

I feel I am a good parent	4.17	4.39	.234
Total Score for Family Subscale	**45.94**	**51.56**	**.000***
I feel that I have a right to approve all services my child receives	4.33	4.61	.272
I know the steps to take when I am concerned my child is receiving poor services	3.06	4.50	.001*
I make sure that professionals understand my opinions about what services my child needs	3.94	4.28	.119
I am able to make good decisions about what educational services my child needs	3.72	4.28	.019*
I am able to work with agencies and school professionals to decide what services my child needs	3.50	4.33	.005*
I make sure I stay in regular contact with school professionals who are providing services to my child	4.11	4.50	.100
My opinion is just as important as professionals' opinions in deciding what services my child needs	4.33	4.83	.045*
I tell professionals what I think about services being provided to my child	3.78	4.33	.019*
I know what services, including educational services, that my child needs	3.39	3.94	.058*
When necessary, I take the initiative in looking for services for my child and family	4.50	4.72	.157
I have a good understanding of the services system that my child is involved in	2.94	4.28	.001*
Professionals should ask me what services I want for my child	4.17	4.78	.015*
Total Score for Service Subscale	**45.78**	**53.39**	**.001***

Evaluation Question 2: How do school professionals perceive the services of the Parent Mentor contributing to family outcomes?

A total of 114 school professionals were recruited electronically to participate in an open-ended questionnaire. A total of 22 school professionals completed the survey, which yielded a response rate of approximately 19%. Table 5 depicts the professional roles of the school professionals in the sample.

Table 5

Professional Roles of School Professionals (n=22)

	n	**%**
General Education Teacher	5	23%
Special Education Teacher	3	14%
School Psychologist	3	14%
School Principal/Special Education Director	10	45%
Social worker	1	4%

Overall, school professionals perceived that parent mentors positively contributed to family outcomes. Analysis of the open ended questionnaires yielded two broad themes: a) perceived mentor contributions, and b) family outcomes attributed to mentor contributions. Within each of the overarching themes, categories emerged to provide a framework for interpreting the collective meaning of school professionals' perceptions (see Table 6).

Table 6

Overarching Themes and Categories

Perceived Mentor Contributions	• Source of Support • Guide in Preparation • Meeting Facilitation
Family Outcomes Attributed to Mentor Contributions	• Interpersonal Communication Skills • Bridging the Knowledge Gap • Attitude Shift

Perceived Mentor Contributions

A total of three categories emerged that related to school professionals' perceptions of mentor contributions. These include: 1) source of support, 2) guide in preparation, and 3) meeting facilitation.

Source of Support. The role of the IEP Parent Mentor was not disclosed nor discussed with school professionals. Not knowing any details about the parent mentor services, school professionals were able to discern a preceding relationship if not a preparatory commitment that had been in place prior to the IEP meeting. It was apparent to school professionals in several instances and at different meetings, that the IEP Parent Mentor and the parent had not only met previously, but they were on good terms with each other. It seemed to school professionals that the mentor and parent were friends and had established a good working relationship prior to the

IEP meeting. As one school professional wrote: "*They seemed to have been very close. They called each other 'friends'"*. Another school professional stated that the *"parent felt supported."*

IEP Parent Mentors were again perceived as a source of support for parents during the IEP meeting itself. During the IEP meeting, school professionals perceived the IEP Parent Mentor as a source of emotional support by being a reassuring presence. For example, one school professional wrote that *"She [the mentor] consoled the parent when parent was upset at one point during the meeting."* Another school professional commented explicitly that, *"She [the IEP Parent Mentor] seemed to be emotional support for the parent. She was reassuring her throughout the IEP."* Additionally, the act of checking with parents for understanding and asking clarifying questions was a common contribution of IEP Parent Mentors. IEP Parent Mentors appeared to be quick to interpret sources of potential disconnect and/or misunderstanding between school professionals and parents in the IEP meetings. School professionals wrote about how this piece of the mentors' role played out by stating, *"She [the IEP Parent Mentor] was very involved in asking clarifying questions."* The same school professional observed, *"The IEP mentor kept asking the parent if she understood. She also clarified several points in the IEP without the parent prompting them."* In another meeting, *"The mentor made multiple clarifications for the parent and she [the mentor] encouraged mom to ask questions."* And still another wrote, *"…[the mentor]ensured the parent both understood and was happy with what the school team explained and proposed."*

Additionally, school professionals described the IEP Parent Mentor contributions in ways that reveal that the mentor often acted as a parent proxy in their attempt to be a source of support. Some parents would defer to the IEP Parent Mentor to answer questions or respond for them, and sometimes the IEP Parent mentor would just speak for the parent. For example, one school professional stated, *"I felt that she [the parent mentor] took over the meeting rather than sitting back and listening. Her input was overshadowing what the school team had to say."* Another school professional described the parent as talking less than normal, *"She [the parent] was more stand offish and let the IEP mentor do most of the talking, whereas, usually she is very talkative."* A different school professional noted, the *"parent mentor would address specific items written on the IEP and made certain that accommodations were actually written down on the IEP as a need for the child."*. Lastly, in one instance the support the IEP Parent Mentor offered as a parent advocate or proxy was not received well by one school professional who was also an IEP team member. For example, this school professional stated, *"The IEP Mentor cut across several of the IEP team members, and made several accusations or questions that the school was inconsistent or in the wrong for how situations were handled last year."*

Guide in Preparation. School professionals also perceived that IEP Parent Mentors served as a guide for parents in preparation for the IEP meeting. School professionals made statements indicating that it was apparent that the mentor had met with the parent prior to the IEP meeting. For example, one school professional wrote, *"I could tell they had been in contact with each other."* Another school professional noted, *"It was obvious they had time to coordinate with each other, and they were on the same page."* Another school professional noticed, *"…she [the parent] had a written list of things they had talked about in advance of the meeting."* A different school professional noted, *"I feel it was good to have someone set* [sic] *down and explain the sections to Mom one-on-one before the meeting"*

Furthermore, the IEP Parent Mentor was described as someone who provided information and explained things to parents prior to the IEP meeting, which was viewed by school professionals as a positive contribution. For example, one school administrator stated, *"It appeared that someone had worked with her on questions to ask."* In addition, another school professional noticed a parent referencing information that had previously been provided to by the IEP Parent Mentor, "*…Parents consulted with the IEP mentor and referred to information she had previously provided them."*

Meeting Facilitation. The majority of IEP Parent Mentor interactions were often complimented by school professionals for helping to facilitate a positive IEP meeting experience. More specifically, school professionals perceived IEP Parent Mentors contributing to more productive interpersonal environments where tension between parents and school professionals were lessened. One school professional stated, *"This meeting with the parent was significantly more relaxed than previous meetings because of the IEP mentor."* One teacher reported, *"The parents were less defensive and more cooperative having input from the IEP mentor that supported the team members' recommendations."* Another school professional noted that the mentor, *"engaged and related with us [the school professionals], which lessened the tension in the room."* Multiple school professionals simply described the parent mentors as *"positive and collaborative".* For example, one school professional pointed out, *"we knew she [the IEP Parent Mentor] could help the parent understand whether or not her demands were realistic".*

Additionally, some school professionals described the IEP Parent Mentor as helping facilitate a positive IEP meeting experience by assisting all IEP team members in keeping the conversation focused and organized. For example, one school professional stated the IEP Parent Mentor, *"provided organization to the conversation; kept the meeting focused"*. Other school professionals wrote that the IEP Parent Mentors were *"solution-seeking"* and *"asked questions that brought out more complete answers".*

IEP Parent Mentors also helped keep the conversations focused during the meeting by sharing important resources and information, as well as offering suggestions. Moreover, the information shared served as a way to further educate school professionals at the IEP meeting about topics related special education so that important decisions could be made, leading to a more productive IEP meeting. For example*, "She [the mentor] had ideas and helped parents listen to ideas of teachers."* Another school professional wrote that*, "she [the IEP Parent Mentor] had good suggestions and input that was focused on the needs of the child."* In terms of offering resourceful information for school professionals, one participant wrote that the parent mentor, *"helped the classroom teacher understand what other teachers do to meet IEP requirements."* And another school professional noted, *"The IEP Mentor helped remind the administration and staff the most appropriate steps to take towards moving from the least restrictive environment to a more restrictive environment"*

Although the presence of IEP Parent Mentors was primarily perceived as a helpful contribution by creating a positive interpersonal IEP meeting environment, there were a small number of school professionals that felt otherwise. Instead, these school professionals felt that the parent mentor acted as a barrier to creating a friendly environment. Moreover, a few school

professionals described IEP Parent Mentors as being frank, defensive, too talkative or too opinionated, such that their presence had an aversive effect on the interpersonal environment at the IEP meeting. For example, one school professional stated, *"She [the parent mentor] was blunt with IEP team members. She did not know all the details and at times seemed to accuse IEP team members rather than seek understanding."* Another school professional shared, *"I felt like she was more on the defensive side and attacking staff members rather than listening to what we had to say. I understand that she is an advocate for the parent, but I do not think her demeanor was friendly or helpful to the IEP."* In addition, a different school professional noted, *"IEP mentor was too talkative and added opinions that were not helpful for the team reaching a common goal or working together. It was as if they just wanted everyone in the room [to know] they knew about IEPs. It was not productive."* One school professional felt that the IEP Parent Mentor *"contributed to an 'us against them mentality"* and the same school professional stated that the parent mentor was *"abrasive, short tempered and appeared to get angry quickly".* One school professional shared feeling like the IEP Parent Mentor did not have a good understanding of the history of all that the school had experienced in working with the parent and child and shared this as a reminder*, "Something to remember is that teachers are teachers to help every student be successful and when we feel we are being attacked by a third party that has no idea what has gone on now for years in this building it makes for a very hostile environment"*

Family Outcomes Attributed to Mentor Contributions

A total of three categories emerged related to school professionals' perceptions of the family outcomes that they attribute to parent mentor contributions. These include, 1) interpersonal communication skills, 2) bridging the knowledge gap, and 3) attitude shift.

Interpersonal Communication Skills. School professionals shared ways that parents' interpersonal communication skills, such as questioning and listening skills, had changed as a result of working with the IEP Parent Mentor. In terms of parents' questioning skills, school professionals described parents as asking more *"educated questions".* In addition, during the IEP meeting they were able to ask more specific questions to clarify their own understanding. For example, one school professional stated, *"The parent asked much more "educated" questions than she normally does"*. Another school professional also noted, *"The parent had significantly fewer questions for the IEP team members because she had the IEP parent mentor to review things with her in advance"*

School professionals also described parents as having better listening skills. However, it is important to note that the parents who were described as having better listening skills were typically the parents who school professionals perceived as also being more cooperative and agreeable to their recommendations. For example, *"She [the parent] would give input, but also listened to school team member's opinions*". Another school professional stated, *"She [the parent] had ideas but listened to the ideas of the teacher more."*

Bridging the Knowledge Gap. School professionals described their observations of parents being more prepared for the IEP meeting and knowledgeable about the IEP planning process. For example, one school professional stated, *"she was very informed and ready with concerns as they came up."* Another school professional noted, *"she [the parent] was well prepared with*

notes and other documents". And a different school professional shared that, *"she [the parent] was very on top of what her child needed"*.

Attitude Shift. School professionals also shared perceptions of parent attitudes that changed as a result of their time working with their IEP Parent Mentor. More specifically, school professionals perceived parents' attitudes in a way that indicated they were more trusting, cooperative, and relaxed.

Several school professionals described parents as trusting school professionals more. For example, one school professional stated, *"[the parent] seemed to begin to trust the team more"*. School professionals perceived parents to be more cooperative by describing parents as having *"more realistic expectations."* For example, one school professional stated, *"the parents were less defensive and more cooperative having input from the IEP mentor that supported the team member recommendations."* It appears that school professionals perceived IEP Parent Mentors to have the unique contribution of improving parent *"cooperation".* In addition, several school professionals shared that parents appeared more relaxed at the IEP meeting with the IEP Parent Mentor present. For example, one school professional noticed, *"Parent was very calm and provided explanations for her thoughts and provided appropriate responses to all team members."* Similarly, another school professional stated, *"parent calmly described her concerns and her desires"*

Discussion and Implications for Future Research

The family-serving community organization that was part of this study deliberately set out to create a program that would help bridge the gap between home and school by offering intensive mentoring support to families navigating special education in the hopes of empowering those families. This preliminary evaluation of year 1 implementation of their IEP Parent Mentor services sought to explore the extent to which levels of family empowerment increased, as well as to understand how school professionals perceived the services of the IEP Parent Mentor as they contribute to family outcomes.

The results from the pre-post FES survey data revealed statistically significant increases in levels of family empowerment on both subscales (family and service), which can likely be attributed to the IEP Parent Mentor services the family received. More specifically, the FES survey is designed to explore the attitudes, knowledge, and behaviors of parents in terms of family interactions (family subscale) and service interactions (service subscale) (Koren et al., 1992). At the item-level (or question-level) the majority of items where significant changes were made are related to the attitudes and knowledge areas (e.g, *"I know what to do when problem arise with my child", I know the steps to take when I am concerned my child is receiving poor services", "My opinion is just as important as professionals' opinions in deciding what services my child needs)*. In contrast, significant changes were not seen among items that were related to the behavioral area (e.g, *"I make sure that professionals understand my opinions about what services my child needs", "When problems arise with my child, I handle them pretty well").* This suggests that the IEP Parent Mentors have a significant role in helping to positively shape family empowerment in terms of attitudes and knowledge related to family and service interactions, but

they may want to consider enhancing their work in ways that can impact the actual advocacy behaviors of parents.

While levels of family empowerment increased, analysis of qualitative data from school professionals raised further questions that should be explored. For example, it became apparent that there were two different mentoring styles present across the meetings: one mentor in a coaching role and one mentor in an advocacy role. Though both mentors brought about changes in parent empowerment, their reception by the other IEP team members (i.e., school professionals) was quite different as were their apparent actions during the IEP meetings. This led the evaluation team to question what guidelines and/or training was in place for the IEP Parent Mentors. As such, one recommendation is that the work of IEP Parent Mentors be clearly defined and for these individuals to receive training that is consistent with the role they are to have (e.g., coach, advocate, or mentor).

Moreover, further examination is needed to understand the nuances of school professionals' reactions to increased parent empowerment. It seemed that parents were perceived as more "cooperative" and more "educated" if they agreed to what was suggested by the school professionals. It appeared that school professionals viewed parents as being more cooperative when they were less demanding and more agreeable or trusting of school professionals' decisions. In addition, there were several instances of the Parent Mentor having to ensure parents' voices were heard at the table, but school professionals often noted the desire to be "heard." In concert with the FES items that did not show a significant increase, it is clear that these parents continue to be less confident when directly dealing with school professionals and in situations where the entire IEP team, including the parent, should be working together for the child. These findings warrant further exploration because it will be important to understand the nuanced ways that the IEP Parent Mentor contributes to ensuring the voices of parents are heard.

Through both parent and school professional responses, it appears that parents, though empowered, do not feel as if they are part of the IEP team, but rather a guest at the IEP team's discussion. Similarly, it seems the school professionals may implicitly still portray an "us vs them" mentality. This begs to question: Do school professionals really want parents to advocate for what they think is right for their child? And if so, what should that advocacy look like? Do school professionals implicitly want parents to not have a voice or to speak up in meetings? Further exploration is needed as to why school professionals struggle with confrontation or genuine participation from parents. At what point does a parent get the label "difficult"? What are common factors that lead up to that label, and how can it be prevented? Additionally, what obligation do schools have to help educate parents on their rights and the special education process beyond providing a copy of procedural safeguards?

Limitations

Some limitations justify caution by researchers who review these findings. First, the present study was conducted in one midwestern state with only a small number of families preventing generalizability from the data. The families who participated were not randomly selected. Families selected were already having difficulty within the IEP system and were requiring additional support to have their needs met. Thus, a previous and often contentious relationship already existed between parents and other members of the IEP team. There was no mentoring

training program or guidelines for IEP Parent Mentors to which the research could compare fidelity to techniques of mentoring. Responses from school professionals were also limited despite multiple requests for participation in the study. Creating a more comprehensive picture of school professionals' experiences and attitudes with Parent Mentors in an IEP meeting is crucial to understanding how the program is achieving its goal of empowering parents.

Conclusion

While the outcomes shared are preliminary, IEP Parent Mentor services appear to have positive impact on levels of family empowerment. However, further study is needed to understand the nuances of how increased levels of family empowerment are received by school professionals. Schools and/or school districts should consider partnering with family-serving organizations in their community to offer similar support for families as they learn to navigate special education planning processes and advocate for their children. When partnering, a system of continuous evaluation should be developed to further the fields' understanding of the benefits of parent mentoring programs, specifically for supporting families of children with disabilities.

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Creating Trauma-Informed Spaces for Youth in Residential Programs

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Abstract

A majority of youth in residential facilities such as residential children's treatment centers and juvenile justice facilities have a history of exposure to traumatic events, contributing to a multitude of long-term mental and physical concerns. Residential facility teachers and staff have the unique opportunity to create trauma-informed spaces - safe, healing environments in all aspects of a youths' life during their stay. Trauma-informed spaces may help youth develop healthy relationships, build resilience, and increase social and emotional skills, all establishing a foundation for future success in their home, school, and community. This article provides suggestions for incorporating trauma-informed strategies across all spaces of the facility to mitigate the negative effects of trauma using Harris and Fallot's (2001) five core values of safety, trustworthiness, choice, collaboration, and empowerment.

Keywords: trauma, trauma-informed care, trauma-informed spaces, residential facility, juvenile justice

Creating Trauma-Informed Spaces for Youth in Residential Programs

Although stress is an important aspect of childhood development, extreme amounts of stress can be toxic. Toxic stress is "extreme prolonged adversity in the absence of a supportive network of adults to help the child adapt" (Souers & Hall, 2016, p. 22). Trauma occurs when toxic stress interferes with typical brain development, resulting in psychological, emotional, and/or physical effects (Perry & Szalavitz, 2017). When activated by stress, the primitive part of the brain prepares the individual to move into defensive mode by hardening posture, increasing heart rate, and breathing. The part of the brain responsible for thinking and communicating is shut down, causing the individual to react in ways to fight the threatening event rather than processing the implications of their actions. Like muscles, the part of the brain most frequently used is the strongest and most likely to be employed during daily activities (Perry & Szalavitz, 2017). When youth are exposed to chronic toxic stress, the trauma causes their brains to be in protection mode at all times, causing difficulty in concentrating, learning, using social skills, sleeping, dysregulation, and aggression (Nemeroff, 2016). Prolonged exposure to toxic stress also increases the individual's risk for developing psychiatric disorders, substance abuse problems, and/or medical disorders (Nemeroff, 2016).

Over 90% of youth in residential facilities (e.g., residential children's treatment centers, juvenile justice facilities) have experienced a range of 2.3 to 5.8 traumatic events prior to residential placement (Barnett et al., 2018). Examples of traumatic events youth may have experienced

include abuse, neglect, household substance abuse, exposure to domestic violence, and parental loss through death, incarceration, abandonment, or divorce (Nemeroff, 2016). Increased exposures to traumatic events often lead to a) illnesses such as obesity, migraines, cardiovascular disease, and diabetes (Nemeroff, 2016); b) behavioral disorders such as anxiety disorder, depression, mood disorders, substance abuse disorders, and post-traumatic stress syndrome disorder (Nemeroff, 2016); c) academic delays such as difficulty reading, writing, solving abstract problems, setting and following through on goals, and maintaining focus and attention (Rossen, 2020); and d) difficulties forming and maintaining healthy relationships with both peers and adults (Rossen, 2020). Youth enter facilities with fractured relationships with adults in school, home, and community settings who have broken and damaged their trust, further contributing to youth traumatic exposure. Residential facility teachers and staff, (henceforth referred to as staff) have a monumental task of forming positive, healthy connections with the youth in their care. Direct or observed experiences within the facility such as restraint/seclusion, staff turnover, forced participation in activities, exposure to other youths' outbursts, and services provided by untrained staff (Barnett et al., 2018) may retraumatize youth and reinforce previously learned negative coping mechanisms. Agency and facility personnel should examine current practices to ensure their practices are conducive to creating an opportunity for youth and staff to form healthy, healing relationships through implementation of trauma-informed practices in all facility spaces.

Trauma-informed care requires systemic adoption of practices promoting a culture of non-violence, academic achievement, and collaboration (Bryson et al., 2017) as well as providing an environment for youth to form healthy attachments with caretakers, reversing many of the long-term negative impacts of trauma (Perry & Szalavitz, 2017). Trauma-informed spaces across all facility areas may increase youth willingness to participate in programming by providing an environment where youth feel safe to take risks and work toward academic and social growth rather than relying on practices such as restraint and seclusion that may be re-traumatizing for youth and staff (Bryson et al., 2017).

With the recognition of prior trauma experienced by many youth in residential facilities, more and more facility personnel are infusing trauma-informed care into their mission statements and daily practices. One example is Cutchins Programs for Children and Families (2020) mission statement, "To help children and families transform significant emotional distress into increased resilience, hope and quality of life. To support the healing and learning process with innovation and integrity, and to serve as a model for best and promising practices". Such infusion may result in the creation of trauma-informed spaces within the facility providing youth with opportunities to form supportive relationships with adults, facilitating healing from trauma, and increasing likelihood of successful reintegration into their home community. The Council of Juvenile Correctional Administrators (2017) called for the nation-wide adoption of trauma-informed strategies seeking to a) increase youth physiological and physical safety; b) teach youth to manage big (e.g., fear, anger, shame, disgust) emotions; c) guide youth to make connections between their behavior and trauma histories; d) respond to the impact of trauma as it relates to forming relations with others; e) provide for a continuum of services across all systems (e.g., foster care, mental health care, legal care, public education); f) conduct comprehensive trauma assessment, screening, and progress monitoring; g) facilitate the development of healing

relations with others; and h) provide support for the youths' family (see Table 1 for additional trauma resources).

Table 1
Trauma Resources

Resource	Description	Website
SAMHSA's concept of trauma and guidance for trauma-informed approach	*Offers definition and guidance for trauma-informed care across a variety of settings*	https://store.samhsa.gov/product/SAMHSA-s-Concept-of-Trauma-and-Guidance-for-a-Trauma-Informed-Approach/SMA14-4884
Child Trauma Academy	*Provides education and information regarding the impact of childhood trauma.*	https://www.childtraumaa.org/
Adverse Childhood Experiences (ACEs)	*Defines ACEs and provides resources to decrease the impact of ACEs*	https://www.cdc.gov/violenceprevention/aces/index.html
Institute on Violence, Abuse, and Trauma	*Lists training opportunities for practitioners and staff serving at-risk populations.*	https://www.ivatcenters.org/trainings-offered
Mindfulness Activities and Interventions for Children	*Provides principles, practices, and interventions related to implementing mindfulness across a variety of settings.*	https://www.waterford.org/resources/mindfulnes-activities-for-kids/
Principles of community-based behavioral health services for justice-involved individuals: A research-based guide	*Provides resources and guidance for trauma-informed care within the juvenile justice system*	https://store.samhsa.gov/sites/default/files/d7/priv/sma19-5097.pdf

National Childhood Traumatic Stress Network (NCTSN)	*Offers free training regarding evidence-based practices related to trauma-informed care.*	https://learn.nctsn.org/
Integrating a trauma-informed approach within a PBIS framework	*Provides strategies for linking trauma-informed care within a PBIS Framework.*	https://www.pbis.org/resource/integrating-a-trauma-informed-approach-within-a-pbis-framework
Trauma-informed teaching: A whole school approach	*Illustrates the whole-school approach to trauma-informed teaching.*	https://www.edutopia.org/article/inside-look-trauma-informed-practices
Applying a trauma-informed framework to the IEP process: From referral to development	*Provides resources for integrating trauma-informed practices in all stages of IEP development.*	https://www.shoplrp.com/product_p/300723.htm
Self-regulation and toxic stress strategies	*Describes self-regulation implementation strategies for a variety of ages/developmental levels.*	https://www.acf.hhs.gov/opre/research/project/self-regulation-and-toxic-stress-series

A method of embedding trauma-informed care within a facility's mission is utilizing Fallot and Harris' (2001) Creating Cultures of Trauma-Informed Care Approach and accompanying self-assessment and planning protocol that describes five core values for creating trauma-informed spaces: a) safety, b) trustworthiness, c) choice, d) collaboration, and e) empowerment. These values may be adopted and adapted for implementation in any residential facility, resulting in a systemic trauma-informed approach to programming. Several entities serving youth with past traumas in residential facilities have adapted this approach and values. For example, Trauma Informed Oregon (2020) used the five core values to develop a sustainable trauma-informed care approach in their statewide child and family services while the Institute on Trauma and Trauma Informed Care (2020) encouraged implementation of the five core values in New York child welfare systems to avoid re-traumatizing practices such as restraint and seclusion. The five core values may build on existing facility programming with adaptations in creating a safe physical and emotional environment for all youth, teaching and modeling how to build trusting relations between staff and youth, promoting youth choice and voice throughout all aspects of their programming, ensuring facility-wide collaboration across staff disciplines and spaces, and empowering youth to set and work towards their programming goals. Residential facilities have

the ability to become trauma-informed when staff have improved understanding of the impact of youths' prior traumatic experiences and how they may infuse the five core values across all spaces and activities, implementing such values to create a facility-wide trauma-informed approach (Institute on Trauma and Trauma Informed Care, 2020). Facilities create trauma-informed spaces by understanding the meaning of each value, as it relates to facility procedures and practices, and integrating strategies that infuse the five values into all daily activities as implemented by all staff.

Safety

According to the Substance Abuse and Mental Health Services Agency (SAMSHA, 2014), safety occurs when everyone (staff and individuals) feels safe, both physically and emotionally in the physical environment. Staff in residential facilities have the unique opportunity to control the environment in a manner so youth may begin to engage the complex area of their brain, the frontal cortex, to more frequently and positively impact learning, memory, mood, and relationship skills (Souers & Hall, 2017). This promotes youth healing from trauma, and provides them opportunities for improved physical, psychological, social/emotional, and academic outcomes while being served in the facility. To accomplish this, staff within these facilities need to operate under a framework that provides youth with felt safety. Felt safety occurs "when you arrange the environment and adjust your behavior so your children can feel in a profound and basic way that they are truly safe" (Purvis, 2007, p. 48.). Staff in residential facilities can create felt safety through many means.

Visual Environment

Staff may begin with the facility visual environment – the whole facility/anywhere youth may be – to enhance or create felt-safety. All areas of a facility should be "warm and reminiscent of a home residence" (Hodgen et al., 2013, p. 682). For some youth, this may be their first example of a safe, healthy environment. Even given the security parameters per policy of what items can (permissible) and cannot (contraband, items which may be used for self-harm or harm to others) be in the facility, staff do have some flexibility. For example, to replicate typical home décor, photographs of group activities featuring current residents could be hung in the recreation room, dorms, and in the multi-purpose room. If individual frames and glass with nails affixed to the wall cannot be used per safety policy, a bulletin board with safety plexiglass or Velcro could be used to protect and affix the pictures. In addition, pictures of staff interacting with the youth during regular programming activities could be included and would serve as a visual reminder of how staff and youth work and play together.

Posters depicting trauma-sensitive phrases can be hung throughout all facility environments and referred to in the midst of challenging situations by staff and youth (see Table 2), providing visual reinforcement and reminders of the facility's trauma-informed focus and youth treatment and programming. Also, staff may utilize a "brag board" in both the residence and the school environments. The brag board in the residence could feature celebrations of progress towards individual and group social and emotional goals developed during group or individual therapy, while the school brag board could display youth's progress towards their academic goals, courses completed, and certificates earned. When possible, the facility walls should be painted using vibrant colors and be differentiated across rooms to avoid institutionalized ambiance. Some

facilities have youth and staff design and paint inspirational murals of hope, perseverance, and resilience to further hone felt-safety as part of their art therapy groups.

Table 2
Trauma-Sensitive Phrases

Value	Phrase Examples
Safety	*"I'm not mad, breathe."*
	"You are trying to be in charge. Is something worrying you?"
	"Kind words and actions, please."
Trustworthiness	*"I am ready to help."*
	"I like helping you."
Choice	*"What do you need right now?"*
	"Here are your options…. make a choice that's best for you."
	"It's okay to take a break from this."
	"How does your body want to move? Which calming strategy would help you?
Collaboration	*"I want to help you with this."*
	"Together let's pretend to smell the soup and blow on the soup."
	"Let's pretend to move this wall together." (diverting aggression safely)
Empowerment	*"I know you're capable of doing this."*
	"You're allowed to feel this way."
	"Look what you were able to feel through... (strategy)" (for use during debriefing)

Adapted from Alexander, J. (2019). *Building trauma-sensitive schools: Your guide to creating safe, supportive learning environments for all students*. Paul H. Books.

Physical Environment

When considering the physical layout of the facility, there should be dedicated spaces across all areas where "we can grant [youth] the permission and provide a safe place where they can just be not ok" (Souers & Hall, 20016, p. 153). Such safe places are not to be confused with time-out/confinement rooms but instead be physically defined places with soft seating, noise-cancelling headphones, weighted blankets, a pad for drawing, books, and fidget items

encouraging youth to practice relaxation, coping skills, and de-escalation strategies (Rossen, 2020). These places can be defined areas in the milieu, in separate rooms, or other common and accessible areas (e.g., a corner area of a room). The safe place walls should have posters with grounding, breathing, and other mindfulness activities, providing the youth visual self-regulation cues and activities they may accomplish while in the safe place. When youth are in the safe place, staff should monitor for safety but not engage with the youth unless youth request it. If de-briefing is necessary, it should occur after the youth leaves the safe place. All staff members will need to teach youth appropriate use of the safe place through explicit instruction in warning signs that they may need a break, how to appropriately ask for a break, behavioral expectations while in the safe place, what signifies the end of the break, and behavioral expectations for re-joining programming. All of these processes need to be built into policy with staff trained on the procedures. When an experience (e.g., structured mealtimes, other youth outbursts, directives to complete activities or assignments) triggers a trauma response, causing youth to feel overwhelmed or dysregulated, they then have a place to be not ok and process their feelings without punishment.

Auditory Environment

The auditory (i.e., sounds) environment also should be considered to increase youth felt-safety. Youth may associate auditory disruptions (e.g., youth outbursts, firm staff reprimands, voice/noise volume) with past events in which they felt unsafe, triggering them and leading to a period of dysregulation. Staff may improve the auditory environment by using earpieces linked to their walkie-talkies to limit the audible noises and codes transmitted through the walkie-talkies which may trigger youth due to their institutionalized nature. Quiet, calming music may be utilized in residence and classroom environments to soften the auditory environment by taking focus from environmental noises that are out of staff's control (e.g., buzzing from locked doors opening/closing). Staff may make further improvements to the auditory environment through the provision of behavior specific praise to all youth in all areas of the facility and across programming. Caldarella et al. (2019) suggests that youth with or at -risk for emotional and behavioral disorders may require 9 positive praise statements for every reprimand to improve engagement. By utilizing the 9:1 ratio facility-wide, youth engagement in the overall programing would increase; thus, increasing time on-task in academic and therapeutic settings (Caldarella et al., 2019). A facility rich with frequent auditory praise increases self-esteem and adds to the supportive, safe culture of the facility (Caldarella et al., 2019) while filling the facility with positive noise. Youth at residential facilities often engage in or have histories of high rates of antisocial behavior, so it is crucial for staff to remember to look for positive behaviors and those behaviors at the youth's functioning level and not compared to typically developing peers. Program administrators can model and reinforce staff praising behavior by following the same praise ratio in their interactions with staff members. The high levels of praise from program administrators enhance the supportive, safe culture and will increase staff members' engagement with facility programming as well as their use of auditory praise with youth.

Trustworthiness

According to SAMHSA (2014), trustworthiness is built through clarity and consistency in all organizational procedures. Supportive, safe relationships with adults are crucial in helping youth heal from trauma. Perry and Szalavitz (2017) state, "the more healthy relationships a child has,

the more likely he will be to recover from trauma and thrive. Relationships are the agents of change and the most powerful therapy is human love" (p. 258). Since healthy relationships are built on trust, one of the primary focuses of the facility's mission should be to develop trust between staff and youth through positive staff-to-youth relations. Facility policies, shared language, and procedures should develop trustworthiness by ensuring consistency of services across all domains of the facility, having transparent expectations and responses, and enabling staff to build and model healthy relations with youth (Harris & Fallot, 2001); thus, creating a safe and predictable therapeutic environment.

Consistency in Expectations

Consistency across all environments lays the foundation for developing transparent, trusting relations between staff and youth. Facility-wide positive behavioral interventions and supports (FW-PBIS) provides a multi-tiered system of support framework for increasing consistency in practices and positive, proactive language across all domains of the facility (Jolivette et al., 2016). A hallmark practice of FW-PBIS is having clearly defined behavioral expectations for youth and staff members (Jolivette et al., 2015). Facility-wide expectations answer the youths' need for consistency by ensuring the youth know exactly what is required of them to meet expectations and the consequences for meeting, or failing to meet, requirements (Jolivette et al., 2016). When youth meet behavioral expectations, staff must reinforce them consistently, using the same menu of contingent reinforcers across all domains to avoid triangulation of staff. Tiered interventions to support the youth in engaging in the desired positive behavior should be consistently implemented in all areas of the facility. Such tiered practices should include those with a trauma-focus to ensure that the whole youth, or all domains, are addressed (Jolivette et al., 2016; Jolivette et al., 2020a). FW-PBIS, when implemented consistently and with fidelity has increased positive staff-to-youth relations by improving staff interactions with youth and decreasing youth behavioral incidents (Kimball et al., 2017).

Day to Day Consistency

Trustworthiness and transparency may be further developed by providing staff and youth with daily schedules in both the school and residence setting. The residence schedule should model a typical family-based home schedule, including times for chores, homework, structured activities, and free play. A structured schedule in the residence provides youth with heightened success in their programming and treatment through eliminating unstructured time that may lead to misbehavior. During education hours, the schedule should mirror those in typical, community schools and include grade-level academic expectations and Individual Education Program (IEP) accommodations for those with educational disabilities - all to prepare youth for the home and school requirements upon discharge. For those youth with disabilities, there are additional resources to assist in implementing trauma-informed IEPs (see Table 1 for example resources). Group and individual therapy should be a part of the schedule and occur at the scheduled time, as if the therapy was provided in an outside setting. If schedule changes occur, the youth should be prepared in advance to minimize triggering trauma or misbehavior. Timers to signify transition, non-contingent breaks, sensory activities, and mindfulness exercises should be utilized and embedded in the residential schedule (Rossen, 2020).

Consistency in Interactions

Facility staff are first responders of healing and may be the first example of a positive adult relationship for youth in residential facilities. During periods of youth disruptive dysregulation, staff should model appropriate behaviors to manage dysregulation and strategies to restore damage to the relationship when youth dysregulation occurs (Souers, 2016). Staff may strengthen trusting, healthy relationships with youth while providing support for developing self-regulation skills through co-regulation (Rosanbalm & Murray, 2017). Co-regulation is "the supportive process between caring adults and children that fosters self-regulation development" (Murray, 2017 p.1). When youth experience strong emotions (e.g., fear, anger, surprise, confusion), staff working with them during the emotional display co-regulate when they validate youth feelings by naming their emotion, reassure the youth that their relationship is not behavior dependent, remain calm during emotional moments, and reinforce self-regulation (e.g., whole body breathing, grounding activities, positive self-talk, and taking a break). Statements such as, "I know you're frustrated that you are missing your visit this weekend. Let's take a few deep breaths and I will be here when you are ready to talk" or "It's ok to be angry that we aren't going on an outing tonight. Would you like to squeeze the stress ball with me?" Another example is "Math frustrates me too. Let's take a break and work on another activity and I will help you with math in a few minutes." Statements like these will validate their feelings, while providing reassurance of a consistent presence during periods of heightened emotion (see Table 2 for other statements for staff relevant across the 5 core values which may have been made into posters). Staff must utilize personal self-regulation strategies to remain calm and compassionate in the presence of youth's escalation to implement co-regulation strategies effectively (Rosanbalm & Murray, 2019). For example, a staff member working with an escalated youth may need to step back and take five deep breaths before responding to the youth's verbal outburst. Remembering youth typically display extreme emotions in the presence of a safe staff member with whom they have developed a trusting relationship may help staff remain calm during emotional outbursts by focusing on continuing to reinforce their trustworthiness rather than taking the youth's words and actions personally.

Youth Choice

Choice occurs when youth are encouraged to make decisions related to their treatment and staff foster youth self-advocacy through delivery of their choice across all settings (SAMHSA, 2014). A defining feature of a traumatic experience is the individual's loss of control; therefore, a critical aspect of healing from trauma is in regaining a sense of control (Perry & Szalavitz, 2017) such as though the provision of choice-making opportunities. Staff have ten different types of choice-making opportunities (Jolivette et al., 2020b; Jolivette et al., 2002) to select from which a) do not alter the objectives of the activity and b) can be delivered across the day and in different contexts to ensure youth have a voice in some aspect(s) of their daily routine. The provision of choice-making opportunities in residential facilities across domains has been effective in improving youth behavior (e.g., academics, Ramsey et al., 2017; Ramsey et al., 2010). Allowing youth to control some aspects of their programming may decrease negative behaviors because a perceived loss of control is often triggering for youth impacted by trauma.

Treatment and Programming

Youth should have predictable and planned opportunities to make choices related to their treatment and programming (Harris & Fallot, 2001). In many cases, youth in facilities have very

little control over anything in their daily schedule (e.g., when to wake up/go to bed, what to eat, what courses to take, when/what to watch on tv, what sport to play during recreation). Youth may benefit from having perceived control over some aspects of their daily treatment and programming (e.g., Jolivette et al. 2020b). For example, youth voice could be cultivated through opportunities for them to be active members of their IEP and/or treatment teams. In the school setting, youth could lead their IEP meetings by identifying their behavioral and academic growth, describing continued behavioral and academic challenges, and advocating for accommodations needed related to their disability (Davis, 2019). Similarly, youth may facilitate their treatment team meeting by starting the meeting, identifying their strengths, sharing progress towards their short and long-term goals, and identifying personal areas of growth. Developing these skills increases self-awareness, self-advocacy, and motivation (Davis, 2019) all supporting trauma-informed spaces as well as fostering skills needed for successful reintegration to their home school or community. Other avenues for incorporating youth choice and voice is providing comment/suggestion boxes in various accessible areas in the facility, allowing them to make decisions related to facility activities and management, their courses or high school exit options, and requesting regularly scheduling individual meetings with their case manager or counselor to voice their preferences for treatment and programming. Such comment/suggestion boxes are not be confused with grievance boxes as those are to point out disagreements while the other is to empower youth to have a say in their daily routines and treatment plans. The staff facilitating these meetings also could use this time to make youth aware of completion dates for groups, classes, and therapy well in advance, allowing opportunities for the youth to prepare for potentially triggering situations, and to make choices related to closure.

Leadership Opportunities

To fully heal from trauma, youth need the opportunity to recognize and develop their strengths so they may focus energy on moving past their traumatic experience(s) to make and realize their current and future positive contributions to their community (Souers & Hall, 2016). Providing youth with meaningful leadership opportunities allows them to make choices about how to contribute to the facility, recognize and build on their strengths, and increase self-esteem. Leadership opportunities that provide an integral service to the function of the facility as well as those mirroring leadership opportunities in less restrictive settings will help the youth learn a) they can make a meaningful impact on their community and b) how to begin to repair their self-esteem damaged through their traumatic experiences (Perry & Szalavitz, 2017). Job opportunities (e.g., FW-PBIS leadership team member, service project coordinator, greeter, school librarian, reading announcements/meal menus) should be posted in a central location so the youth may apply for preferred jobs. Requiring the youth to apply and interview for the job will help them learn skills critical to their success on discharge and require youth to have strengths-based conversations with staff. Such strength-based conversations reaffirm their worth, growth, and positive staff relations. To make further connections with real-world experiences, staff members monitoring the leadership job should provide youth guided reinforcement upon satisfactory completion of the job in a transparent and consistent manner. For example, youth could earn time with a preferred staff on Saturday after satisfactorily completing their jobs Monday through Friday.

Facility-Wide Collaboration

Collaboration amongst facility staff, youth residents, and youth families is a critical component in organizationally transforming a residential facility to be trauma-informed (Menschner & Maul, 2016). Such collaboration is broadly based on a shared vision, long-term commitment, resource sharing, and evidence-based lens of and for adopting trauma-informed care (Dinh, 2020) with consistent and clear communication. Collaboration may be broadly defined as a set of individuals or a team working together for a common goal; in this case, the goal is to create a trauma-informed space within the residential facility. A team may be formed within the residential facility to facilitate the shift to a trauma-informed space with such stakeholders as a direct care staff representative from each discipline, several current youth residents representing the different age ranges served, past residents, current and past guardians/family members (e.g., siblings, grandparents), and community partners (e.g., local mental health providers). Thus, a collaborative facility-wide team would have representatives with expertise from different specialties involved in trauma care or personal experience with trauma. Collaboration may take many forms at different times and may be considered cross-agency collaborative efforts (Olafson et al., 2016).

Prior to and upon entrance

The residential facility may partner with those who screen youth for trauma prior to entrance and upon entrance. For example, Menschner and Maul (2016) state "it is essential that providers within a given community or system of care work together to develop a trauma-informed referral network" (p. 7). This network can then build upon each other's trauma expertise to help build trauma-informed spaces within the facility based on youth and family case histories and intake data.

Transitional services for release

It would be important for the residential facility to share descriptions of and processes for the trauma-informed spaces which were helpful to the youth when preparing for their discharge. Such sharing could be incorporated into transition planning and transition meetings, contact, and correspondence with the next placement (e.g., family home, group home, shelter care) for the youth. This sharing could be conducted with Memorandums of Understanding or other agreements. Such sharing sets the stage for a continuance of care which is important for youth who have experienced trauma. However, the majority of collaboration will occur once youth are admitted to and receiving services within the facility.

Within facility supports

For residential facilities implementing FW-PBIS or another multi-tiered system of support framework, identifying, adopting, adapting, and implementing trauma-informed approaches to facility space would be a natural outgrowth of such teams (Brennen et al., 2019). Within facility supports for trauma-informed spaces could be provided through specific facility/organizational-wide trauma models or tiered-trauma practices based on the work of the collaborative team.

Facility/organizational-wide trauma approaches

The team may decide that a facility-wide approach to trauma is necessary to meet the needs of the youth served within the facility. This approach would mean that every youth receives trauma-

informed treatment and programming as part of their daily schedule which is delivered by staff across disciplines, activities, and times. Menschner and Maul (2016) cite six essential components for such an approach: "1) leading and communicating about the transformation process, 2) engaging [youth] in organizational planning, 3) training clinical as well as non-clinical staff members, 4) creating a safe environment, 5) preventing secondary traumatic stress in staff, and 6) hiring a trauma-informed workforce" (p. 2). A few examples of best practice facility/organizational-wide trauma models include a) Attachment, self-Regulation, and Competency (ARC: Kinniburgh et al., 2005) b) Sanctuary (Bloom, 2013), and c) Children and Residential Experiences (CARE: Holden, 2009) (see Table 3 for additional facility-wide trauma models).

Table 3
Trauma-informed Evidence-based Interventions/Frameworks for Facility-Wide Implementation

Evidence-Based Practice	Description	Website
Child-adult relationship enhancement (CARE)	*A program intended to complement existing therapy services to improve youth-caregiver relationships*	https://www.ccfhnc.org/programs/pcit-care-training/#care
Attachment, regulation, and competency (ARC)	*A flexible framework developed for trauma-exposed youth in residential placements*	https://arcframework.org/
Trauma-focused cognitive behavioral therapy	*A specialized therapeutic approach for youth displaying trauma-induced behavior*	https://tfcbt.org/
The Sanctuary Model	*A model used to provide a trauma-informed approach facility-wide*	http://www.sanctuaryweb.com/
Trauma affect regulation: Guide for education and therapy (TARGET)	*A trauma-informed educational and therapeutic approach helping youth and adults understand and regulate trauma related triggers*	http://www.advancedtrauma.com/Services.html
Trust-based relational intervention (TBRI)	*A trauma informed program addressing physical needs, attachment needs, and corrective principles for trauma-induced behavior*	https://child.tcu.edu/about-us/tbri/#sthash.yF5OnsnO.dpbs

Tiered trauma practices

A tiered approach to a trauma-informed space means that a collection of trauma-informed practices would be identified by the team based on their empirical evidence, each practice would be assigned to one of the multi-tiered system of support tiers [tier one: universal, delivered to all youth; tier two: targeted, delivered to some youth in small groups, intensified, and in addition to the tier one supports; tier three: intensive, delivered to a few youth one-on-one or small groups,

intensified and high dosage, and in addition to tier one and two supports) (e.g., Chafouleas et al., 2016). A few examples of best practice tiered trauma practices include a) Trauma Affect Regulation: Guide for Education and Therapy (TARGET: e.g., Ford & Hawke, 2012), b) Cognitive Behavioral Intervention for Trauma in Schools (CBITS: Jaycox et al., 2018), c) Structured Psychotherapy for Adolescents responding to Chronic Stress (SPARCS: DeRosa & Pelcovitz, 2008), and d) Trauma Systems Therapy (TST: e.g., Saxe et al., 2006) – the specific tier for a practice would be dependent on youth data (e.g., Jolivette et al., 2020a; Kumm et al., 2020). When all facility staff work together with a common goal – creating trauma-informed spaces – improvements across Harris and Fallot's (2001) other four core values can be seamlessly achieved. Facility-wide collaboration breaks down the known silo's operating across the different disciplines in residential facilities (e.g., education, security, treatment, mental health) to promote improved youth outcomes, equity in programming, improved climate and culture, and universal trauma-informed approach. This collaboration should be rooted in goal-setting, progress monitoring the implemented trauma-informed approaches, and improving upon trauma-informed policies and procedures.

Youth Empowerment

Empowerment occurs when the organization uses a strengths-based approach to internalize a belief that individuals can heal from their trauma background, develop resilience, and set and meet goals (SAMHSA, 2014). Staff in facilities often attempt to "fix" problems or make things easier for youth in efforts to compensate for the traumatic experiences in the youths' past. The practice of "sewing their pillows" (Souers & Hall, 2016), often stemming from compassion, is actually disempowering as it may develop learned helplessness in youth and sends the message that if they act up enough or wait staff out, someone will do the hard things for them. Inversely, staff may empower youth through using a strengths-based approach to teach goal setting and resilience. Staff utilize a strengths-based approach through highlighting youth's positive qualities and success, increasing the likelihood of recurrence (Souers & Hall, 2016), rather than focusing on their deficits.

Youth served in residential facilities are accustomed to hearing what their emotional, behavioral, and academic deficits may include. For example, treatment team meetings often begin by describing the youth's negative behaviors at the school and in the residence areas. Staff and youth can collaborate to develop personal (e.g., completing a set number of assignments independently, completing morning/evening routine independently) and group (e.g., keeping the total number of collective critical incidents below a set number, collectively working a set amount of hours in their leadership jobs) goals and create measurable steps to meet the goals – with the youth leading activities to reach each goal. As youth make incremental steps toward meeting the goals, staff and youth should celebrate forward movement, sustaining momentum for continued dedication to the goals. Youth should have access to meaningful data that shows their growth in their goal areas relative to their starting point and they should be taught how to reset from a set-back in order to continue working towards a goal. Staff may model this process by selecting a personal goal and allowing the youth to monitor staff progress towards the goal (e.g., staff saying providing youth nine behavior specific statements for each redirection/negative statement). For example, a staff member training for a marathon, may have the youth map out the daily training schedule, tracking the staff member's success in completing the daily training

runs. When the staff member misses a training run, he or she can show the youth how to readjust the remaining training runs for that week to continue to make progress towards the goal of completing a marathon. Teaching goal setting to youth may develop resilience, which is the ability to recover from a setback or a challenge while making progress towards goals (Souers & Hall, 2016). For example, a youth might have a goal to avoid taking things that do not belong to them and experience a setback when they take a pencil from another youth's desk. They can recover from the set back by returning the pencil and internalizing a statement such as "I did not meet my goal today, but I will try again tomorrow". Such examples highlight how staff can empower youth to address life challenges, including past disappointments and trauma.

A strengths-based approach helps foster growth in goal setting and resilience building. As staff hear about a youth's history, it is easy to focus on the emotional response to the stories. Youth are more than their trauma and the details of their story should not cause staff to develop preconceived notions about the youth's future (Souers & Hall, 2016). Staff should always communicate, in both words and actions, that they are not worried about what happened in the past to the youth but in watching the youth experience success with current program goals. All behavioral conversations should begin with a positive statement relating to the current situation, then identify the area of growth, and end with a statement communicating their belief in the youth's ability to work towards the area of growth. For example, "I noticed that you were focused and on-task during your writing assignment today. I noticed that you got distracted during math. I believe you will be able to remain on-task in math and reading tomorrow". When youth are surrounded by a team of people who believe in them and encourage them to work towards their academic, social, and emotional goals, they will develop the capacity to believe in themselves.

Conclusion

Practices that enhance safety, trustworthiness, choice, collaboration, and empowerment creates trauma-informed spaces - a healing environment for youth in residential settings (Harris & Fallot, 2001), increases youth willingness to participate in facility programing, and may decrease the use of restraint and seclusion (Bryson et al., 2017). Trauma-informed strategies are more powerful when implemented facility-wide as consistency and predictability are key components of youth felt-safety, and in developing trusting relationships between youth and staff. Residential facility staff may create and provide trauma-informed spaces conducive for youth healing from past trauma by examining current facility policies and procedures, aligning them with the five core values (safety, trustworthiness, choice, collaboration and empowerment), keeping the practices that compliment these values, and committing to replace the practices not complimenting the values. Staff from each discipline (e.g., units/dorms, education, recreation) should collaborate and each adopt one of these core values to address the trauma needs of their youth. As the discipline develops strategies and procedures for implementing the selected value, utilizes the strategies and procedures within their area, and revise any aspects of the strategy not working, they can then train other disciplines to use their strategies, gradually moving to facility-wide implementation of practices complimenting all five values. Future researchers may include youth and staff perspectives on the impact of such facility-wide trauma-informed spaces for sustainability and capacity-building purposes.

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Retaining Special Educators with Autism Expertise in Schools

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Abstract

At a time when there is an increase in prevalence of autism spectrum disorder (ASD), creating a high demand for professionals who have knowledge and skills in the use of evidence-based practices identified for students with ASD, there is also a severe shortage of special educators in our schools. Teacher attrition is a significant contributor to this shortage. Therefore, it is important to determine the factors that support the retention of special educators with a specialization in autism who have a choice of employment options. This study surveyed graduates of an M.A. Degree/Autism specialization program who identified the factors they sought in a position. Results from this study indicate that providing professional development opportunities and support for leadership positions may impact the retention of highly skilled personnel.

*Keyword*s: special educator retention, autism, teacher-leader, BCBA

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Retaining Educators with Autism Expertise in Schools

The prevalence of individuals with autism spectrum disorder (ASD) has been increasing and is currently 1 in 54 (Maenner et al., 2020). The Department of Education, Office of Special Education Programs (OSEP) 41st annual report to Congress (2020) indicated that the percent of children and youth ages 6 to 21 with autism doubled from 2008 to 2017 across the 50 states. Behavioral and educational interventions are identified as effective approaches to address the challenges in social-communication and repetitive behaviors associated with autism (Hall, 2018). Consequently, there is a demand for knowledgeable and skilled personnel competent in designing and implementing beneficial educational programs for the growing number of students with ASD.

Special education teachers are the personnel most frequently responsible for designing the educational programs for individuals with ASD. Special educators with the additional

knowledge and skills in the implementation of the identified evidence-based practices for individuals with ASD (Hume et al., 2021) are particularly sought for teaching positions. Since the majority of the identified evidence-based practices for individuals with autism have their foundation in applied behavior analysis (Steinbrenner et al., 2020), graduates of programs with an emphasis on behavior analysis, such as those with embedded course sequences verified by the Behavior Analysis Certification Board®, who also have a teaching license or credential would have this specific expertise and would be in high demand.

Unfortunately, the U.S. Department of Education consistently identifies special education as an area of teacher shortage (Cross, 2017) with a shortage of between 8% and 10% for much of the previous decades (Mason-Williams et al., 2020). In some states, such as California, the situation is worse with 64% of special education teaching positions in 2014-2015 filled with personnel without a credential (Carver-Thomas & Darling-Hammond, 2017). These shortages mean that the most vulnerable students with the greatest needs are taught by those who are the least qualified (Ondrasek et al., 2020) and this situation is exacerbated in high poverty schools or those that serve racially, ethnically and socio-economically diverse communities of students (Mason-Williams et al., 2020).

In order to address the shortage of autism specialists, there needs to be a focus not only on the recruitment to the profession, but on ensuring there is a system of support for retention (Ondrasek et al., 2020; Vittek, 2015). In his report, Futernick, (2007) pointed out that without a focus on retention, like a bucket with a hole, we will continuously fill special education teacher vacancies with those who leave the field. In their review of the literature on attrition and retention from 2002 to 2017, Billingsley and Bettini (2019) found that special educators are more likely to leave as a result of demanding working conditions, a lack of support from administrators, colleagues, and paraprofessionals, caseload size, financial compensation as well as for nonwork related reasons. Four of the 25 studies included in this review focused specifically on attrition of teachers serving students with emotional behavior disorders, but none focused on personnel with autism expertise.

Reviewing the literature on teacher burnout, Brunsting, Sreckovic and Lane (2014) found 23 relevant studies addressing special education teacher burnout. Their findings of the factors contributing to burnout are similar to those resulting in attrition and include: lack of support from principals, excessive paperwork and non-instructional tasks, challenging student behaviors, role overload, and an expectation/reality mismatch. Moreover, Wong, Ruble, Yu, and McGrew (2017) found that burn-out as measured by the personal accomplishment of special education teachers working with students with ASD has a significant direct effect on student Individualized Education Program (IEP) outcomes as measured by a goal attainment scaling process. The results of these studies underline the necessity of supporting and enhancing the competence of autism specialists in order to avoid the negative impact of burnout on the specialist, and on the progress of the individual with ASD.

Special educators with autism expertise who also are Board Certified Behavior Analysts® (BCBAs) are also in demand to fill positions in organizations that serve individuals with autism in the home, in community settings, and as consultants to school districts. An analysis of job postings published in 2020 by the Behavior Analysis Certification Board, indicates that

there has been an increase in the demand for BCBAs each of the last 10 years, with a 17% increase between 2019 and 2020 across almost every state, with the highest demand in 2020 in California, Massachusetts, Texas, Florida and Georgia. Currently 73% of all certified behavior analysts at all levels (bachelor, Master, Doctoral) identify autism spectrum disorder as their primary area of professional emphasis.

The combination of training for a special education credential and board certification as a behavior analyst provides a valued combination of competencies. However, information about the retention of special educators who also have behavioral competencies and autism expertise in the school system is lacking. Public school systems aiming to retain special educators who are also certified as behavior analysts have the added challenge of competing with another high demand profession for which these teachers also are qualified.

Special educators who are also BCBAs clearly have a choice of positions, especially if they are working in any of the high demand states. Information from a sample of highly educated special education graduates, some of whom also obtained their BCBA, to determine what they seek in a position, would provide guidance to the field regarding the supports needed to retain the most competent personnel. The benefits of retaining competent special educators include employing personnel who can a) design individualized education plans that maximize student potential and result in progress with goals, and b) incorporate strategies to prevent challenging behavior that could result in alternative placements.

The following study surveyed nine years of program graduates (N=101) from a university graduate program providing an autism specialization with the aim of determining the sources of supports for those remaining in the profession. Graduates of this program have a M.A. Degree, a focus on providing education for individuals with ASD that includes implementing evidence-based practices, and embedded opportunities for practicum experiences. The following research questions were addressed in this study:

1. What percentage of survey respondents remain in a position focused on the education of individuals with ASD?

2. How many graduates change positions within the field?

3. What factors are associated with changing positions from or within the school setting? and

4. What types of positions are chosen by graduates with both a special education credential and a BCBA®?

Method

Graduates Completing Survey

Graduates from nine cohorts of a M.A. Degree program in California with a concentration in special education and a specialization in autism (N=101) were invited to participate in the study. The two-year master's degree program embedded a Verified Course Sequence (VCS) for certification as a Board Certified Behavior Analyst®, as well as an approved Behavior Analysis Certification Board® supervised practicum experience that provided half the required hours.

Additionally, the M.A. degree program also embedded the required coursework for the Professional Clear Education Specialist, or special education, credential.

Graduates enrolled in the two-year M.A. Degree program simultaneously completed the requirements for Induction, including receiving support from their school district. It was also possible to complete requirements towards certification as a behavior analyst during this program. Certification is organized by the Behavior Analysis Certification Board® (BACB) and requires a Master Degree, completion of a BACB Verified Course Sequence, field experience hours supervised by a BCBA, and passing a multiple choice exam. Once certified, specified hours of continuing education units including CEUs in specific areas (i.e., ethics, supervision) is a requirement for certification renewal every two years.

Candidates admitted to the program were seeking M.A. Degree preparation that would lead to a Professional credential in special education with a specialization in ASD, or a BCBA certification, or both. The program used a cohort model with the intentional development of communities of practice to foster peer collaboration. Course content focused on the implementation of evidence-based practices, with the majority of these practices having their roots in behavior analysis (Hume et al., 2021), paired with coaching from a mentor.

Survey Contents

Participants completed an 18-item survey. They reported the year they graduated, their role when they graduated, if they remained in the field, if so their current role, if they obtained BCBA certification, and how many times, if at all, they change positions since graduation. If position changes had occurred, they selected their reasons for the change(s) from a list of possible reasons provided. They indicated the sources of support for sustained use of evidence-based practices and the frequency of coaching or supervision they received, if any. They were also asked to rank their top three stressors in their current role, whether or not they anticipated changing positions within the next five years, and if so, the factors contributing to that potential switch. They were also provided with five 5-point Likert-type questions to evaluate job satisfaction, whether they felt they were supported in their current position by administration, and whether they believed the M.A. program prepared them to implement evidence-based practices (EBPs) effectively. A final question asked them to indicate the aspects of the M.A. program that contributed to their retention in the field from a list of seven factors.

The M.A. graduates were sent an email message from the special education department program coordinator with whom they were all familiar, explaining the purpose of the survey. IRB approval was obtained for all evaluation studies of graduates. Participants were informed that individual results would remain confidential. They were provided a hyperlink to the survey and the opportunity to voluntarily and anonymously answer the online survey items using Survey Monkey. Results were then sent anonymously to the second author. Reminder emails about the survey were sent out after two weeks.

Results

The survey was sent to 101 graduates from the M.A. program, of which 57 responded (56%). The proportion of respondents with and without a special education credential (77% with & 23% without) was nearly identical to the overall sample who received surveys (79% with and 21%

without). The respondents without a teaching credential were working toward the BCBA® qualifications only. Ninety-three percent of respondents agreed or strongly agreed that the M.A. program prepared them to be able to implement evidence-based practices.

Fifty-four of the 57 respondents remained in the field (94%). The three who exited the field indicated the reason was due to unrelated life circumstances such as starting a family. At the time of the study, more than half of the respondents (n=32) worked for a school district while the remaining (n=22) worked for a private agency serving individuals with autism and their families. Eight graduates who were working for a school district also had certification as a behavior analyst or were BCBAs.

Why Graduates Changed Positions

A total of 72% of respondents changed positions since graduating (n=41). The average number of times graduates changed positions was 2.0 for all respondents. Over 50% agreed or strongly agreed that they changed positions because of frustration in their job. The most frequently identified stressors graduates identified in their current positions were 1) finding time to train support staff, prepare for teaching, create student materials, and plan for IEPs, and 2) addressing challenging behaviors from students. Approximately one third (31%) of the respondents who switched positions strongly disagreed, disagreed, or remained neutral that they receive support from administration (e.g. Principal, School Psychologist, Clinical Director) that helps them perform their job to the greatest extent of their ability.

The top four factors graduates indicated as reasons for changing positions were: 1) seeking professional development opportunities (35%), 2) as a result of a promotion (35%), 3) better pay (33%), and 4) increased opportunities to implement evidence based practices (29%). See Table 1 for a description of the reasons for changing positions by respondents for each of the times they switched positions since graduation. The lowest three factors were: preference for level of severity of individuals with of ASD on caseload (5%), ethical issues (5%), and 3) smaller caseload (3%). Some graduates changed positions within a school or district and others switched districts.

Table 1
Reasons for Position Changes by Graduates

Reasons	n	% of graduates
Professional development opportunities	20	35%
Promotion	20	35%
Better pay	19	33%
Increased opportunity to implement EBP's	17	29%
Promotion opportunity	13	22%
Increased flexibility of schedule	11	19%
Lack of support from administration	10	17%

Unrelated life circumstance	9	15%
Support from colleagues for the implementation of EBP's	8	14%
Increased support from new colleagues	7	12%
Convenience of job site location	7	12%
Preference for age of individuals on caseload	3	5%
Preference for level of severity on caseload	3	5%
Ethical issues	3	5%
Smaller caseload	2	3%

Twenty-two of the respondents indicated that they currently work for a private agency and approximately half (n=12) of them also held a teaching credential. Ten left a position with a school district to work for an agency and two choose a position with an agency upon graduation. The top-rated reasons for choosing to work for an agency were the same as for the overall sample: professional development opportunities (70%), increased opportunities for use of evidence based practices (60%), promotion (50%), and better pay (50%). In addition, graduates that changed positions from a school district to an agency did so due to increased flexibility in their work schedule (30%) and perceived increased support from colleagues (30%). None of the respondents who worked for a private agency when they started the M.A. program left for a position in a school district due to the lack of the required credentials. Twenty-one respondents (68%) reported that they anticipate changing jobs within the next five years. The highest two reasons for anticipating a job or position change were promotion (35%) and better pay (28%).

Sources of Support for Retention

The top sources of support reported by graduates for using evidence-based practices in their current position were: collaboration with colleagues (86%), attending conferences paid for by their school district or private agency (65%), and by reading up-to-date peer-reviewed journals (60%) (see Table 2 for full results). Ninety-three percent of respondents agreed or strongly agreed that collaboration with colleagues helps improve overall satisfaction in their current position.

Table 2
Sources of Support in Current Position

	n	% of respondents
Collaboration with colleagues	49	86%
Attending conferences paid for by your *school, district, or agency*	37	65%
Reading up-to-date peer-reviewed journal articles	34	60%
Attending in-service trainings provided by your	31	54%

school, district, or agency		
Collaboration with other graduates from MA program	29	51%
Collaboration with administration	29	51%
Textbooks from the MA degree program classes	26	46%
Attending conferences paid for *on your own*	20	35%
Using peer-reviewed journal articles obtained while in MA degree program	18	32%
Slides or notes from the MA degree program classes	13	23%
Using the National Professional Developmental Center (NPDC) on ASD website	13	23%

When asked about the frequency of coaching or supervision they received since graduation, 92% of respondents who either had worked or worked (N=24) for a private agency reported they received consistent coaching support or supervision either weekly (50%), or monthly (50%). The majority of the graduates that received weekly supervision or coaching have been getting that intensity the entire time since they graduated (83%) or up to seven years. In contrast, only 25% of respondents (n=8) that worked in a school district reported receiving any supervision support since graduation or post Induction, and this occurred weekly for only one graduate and monthly for two others. Graduates who did not receive supervision from school district personnel held a variety of positions including special education teachers, autism behavior specialists, one school psychologist, and one principal.

Discussion

The graduates who responded to this survey remain in the field (94%) in some capacity regardless of reported frustration or lack of administrative support in a position, in part, because they have a choice of employment options. Three-quarters of the special educators/behavior analysts had changed positions since graduation. The reasons that the respondents changed positions, including leaving the public schools - to obtain professional development opportunities, to receive a promotion, better pay, and increased opportunities to implement evidence-based practices in this study - are consistent with the factors identified by Mason-Williams and colleagues (2020) who recommend systemic changes guided by policy. In addition, the results of this study indicate that when there is a lack of personal accomplishment for special educators, they not only experience burn-out (Wong et al., 2017) but they will leave their position if they have a choice of a job.

It is clear from these graduate's responses that arranging for professional development opportunities is key to retention. Ondrasek and colleagues (2020) agree with these findings and write, "Access to high-quality preparation and professional learning opportunities can help curb attrition and ensure that special education teachers stay in the field" (p. 13). It is also clear that such opportunities are currently not a priority in the public school systems where the graduates were employed. There are currently no state required CEUs for renewing professional credentials in special education which would encourage the LEAs to provide professional development, and respondents reported few to no arrangements for mentoring and coaching since they completed the initial induction program and graduated with their M.A. degree.

In addition, Natale and colleagues from the *Teachers of the Year* network (2013) identified

career pathways that take into account the mobility of teachers as a hallmark of successful educational systems internationally and recommend a clear path to career advancement within the school systems. Respondents in this study identified seeking a promotion as one of the top reasons for changing positions, including leaving the public schools. Danielson (2006) describes teaching as a "flat" profession and recommends that education systems consider teacher-leadership positions to capitalize on teachers' experiences and desires to have influence beyond the classroom. A study of pre-service teachers indicates that teachers aspire to have a leadership position for at least part of their responsibilities after five years and even more so after 10 years of working in the profession (Reeves & Lowenhaupt, 2016). The data from this study is consistent with these findings.

Survey respondents identified collaboration with colleagues as the most frequently selected source of support for retention by graduates, which is consistent with a recommendation from Danielson, for school personnel to create a culture of professional inquiry that promotes professional learning and collegiality as part of a teacher-leaders' role. Providing the time and resources for peer collaboration is likely to prevent burn-out (Leko et al., 2015) and contribute to retention of these valuable personnel. There are many opportunities for competent special educators to provide leadership and support to others. Support from teacher-leaders would reduce the stressors related to IEP planning, supporting staff, addressing challenging behaviors, and organizing materials that were reported as stressors by respondents of this survey. They can serve as Mentor or Guide teachers during candidate student teaching or clinical pre-service experiences. They can support new teachers during Induction. In addition, they can provide specialized training and support such as with content focused on strategies for addressing the characteristics of ASD, addressing challenging behavior, and designing data collection systems for progress monitoring. They also can provide the needed training for paraprofessionals regarding foundational skills for working with students with disabilities, including students with autism (Butt & Lowe, 2012).

The fact that 48% of the respondents working in schools reported no mentoring, coaching or supervision since graduation is alarming. Although there is a cost to creating teacher-leader positions and providing coaching support to special educators, the cost to the school, and to the students, when trained educators leave and are replaced by unprepared staff is much higher. The importance of arranging for opportunities to interact and obtain support from knowledgeable colleagues was essential for the survey respondents as evidenced by the large number (86%) who attributed their ability to sustain EBPs in their current practice due to collaboration with colleagues.

In addition, university and college programs producing competent graduates can facilitate continued collaboration of peers through the provision of professional development opportunities. These could include invitations for guest speaking in college classes, arranging workshops (i.e., especially those generating BCBA approved CEUs), or arranging for graduates to provide coaching or supervision for graduate students in training. In addition, providing professional development activities such as support for attending conferences or providing subscriptions to relevant journals was valued by these graduates and could be arranged by employers.

Limitations

It is important to note that the graduates responding to this survey are from several cohorts in only one university program that is located in an area of the United States where there are many agencies supporting individuals with ASD through funding from insurance companies. It is also important to consider that 43% of the graduates that did not respond to the survey and their responses may have been different, although a response rate of 57% is often considered acceptable in survey research (Baruch, 1999). It is also not known which aspects of the university program resulted in graduates who remained committed to the field and focused on implementing evidence-based practices. Future research would need to address these questions.

Conclusion

This study provided information about the reasons special education professionals with competence in autism spectrum disorders leave or remain in their current positions in the public schools in a community with a high demand for their expertise outside of the school system. These findings suggest that school districts providing a career pathway for teacher leadership and professional development activities may foster a culture of inquiry (Danielson, 2006) that supports teacher retention. The relationship between creating teacher-leader positions and the retention of special educators needs to be evaluated through further research. Administrators responsible for recruiting and maintaining a skilled teacher work force do not have to assume that teacher attrition is a given. This study suggests that there are factors within the control of district and school administration that can lead to retention of their most talented and skilled teachers.

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Life Skill Programs: An Exploratory Survey of School Based Programming in the Public High School Setting

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Abstract

The purpose of this survey was to explore the uniformity of current life skill programs by identifying how individuals are provided instruction in the daily living skills needed to complete routine life functions, through categorizing common curriculum themes and standard program formats. *Methods:* Special education professionals (N=100) working with adolescents with cognitive disabilities completed descriptive online questionnaire surveys. *Results:* The survey identified a lack of understanding of state requirements for life skill programming and the criteria that defines a life skill program. While some programs used a curriculum, the majority did not. Additionally, pre-test assessments were not used to gather baseline data. *Conclusion*: Life skill programs vary widely in scope and structure. Life skill programming needs to become more standardized, with the use of baseline assessments to measure progress and program effectiveness. Future research is needed to determine best practice approaches to life skills programming.

Life Skill Programs: An Exploratory Survey of School Based Programming in the Public High School Setting

The purpose of a life skill program is to provide individuals with the daily living skills needed to complete routine life functions. “Life skills are adaptive, positive behaviors that enable an individual to meet the challenges and demands of everyday life effectively” (McPherson et al., 2016, p. 2). Life skills include the ability to communicate, develop relationships, perform self-care, engage in the environment through occupation, and complete daily living tasks. (Alwell & Cobb, 2009). All individuals need life skills, regardless of cognitive ability. While typically developing children naturally have experiences that foster these skills, children with disabilities often miss out on these experiences at the same age due to medical or developmental involvement. As typically developing children expand their own life skills and their social world matures, the gap in life skills for children with disabilities grows. Sheppard & Unsworth noted “it can be particularly challenging for young people with intellectual and developmental disabilities (IDD), many of whom appear restricted by others’ low expectations and fear for their safety and who frequently have reduced opportunities for developing self-determined behaviors (2011, p. 393). This results in a need for schools to create occasions for life skill development (McPherson, et. al., 2018). In 2004, the Individuals with Disability Education Act (IDEA) was amended to specifically identify the need for schools to include life skill training in the educational process. The amendment set forth the requirement that “each state create an additive educational framework that provided all students, including those with PMD [Profound Multiple Disabilities], the opportunity to access, to participate, and to progress in the general education

curriculum in addition to receiving instruction in a functional life skills curriculum." (Bobzien, 2014, p.1). However, life skill programs need to do more than exist to be successful, they must be evidence based and measurable. They need to be built in context. The No Child Left Behind federal legislation (2001) has increased focus on the development of academic skills and test scores, resulting in a shift of focus away from life skills. Situated learning provides classroom lessons in the form of real life activities. These hands on opportunities, in functional settings, create more meaningful learning. (Meyers, 2011). The purpose of this study was to explore the structure and implementation of life skill programs in the public high school setting.

Literature Review

A literature review using MeSH keywords "adolescents with disabilities", "life skill program", "curriculum" and "situated learning" was used to locate research studies on current life skill program structure, curriculum, assessments and outcomes. The literature indicates there is a need for life skill instruction, increased structure, contextual learning environments and evidence based practice in programming. There is also an identified need for current research to be completed in the area of life skill programming.

Arnold-Reid, Schloss & Alper (1997) stated "a primary purpose of special education is to teach people to live as independently as possible" (p.186). It is documented individuals with developmental disabilities are behind their typical peers in the achievement of daily living skills and life skills. Experiences are often altered due to physical and medical limitations, resulting in decreased opportunity to develop skills through trial and error. Due to the nature of having a developmental delay, individuals may not be expected to develop age appropriate tasks when they are younger, then as adults lack the skills due to decreased exposure. Adolescents with cognitive disabilities tend to have less functional skills compared to same aged peers (McPherson et al., 2018). Adolescents and children with disabilities may not be cognitively ready to learn life skills at the same time as peers, may not be available to learn the skills because they are participating in medical and therapeutic interventions focused on other skill sets, and/or have a decreased exposure to natural opportunities (McPherson et al,, 2018). As children with disabilities reach a point to learn the skills, their non-disabled peers have moved on to different skill attainment. These skills are then bypassed as the individual grows older, resulting in less exposure in life skill activities. This impacts the degree of independence achieved in these areas despite the individual having the capability to learn. Life skills programs that have a focus on daily living skills improve an individual's ability to care for themselves. Individuals who have greater independence have a higher quality of life (McPherson et al., 2016). Students who are placed in genuine life situations, who are made responsible to make decisions and respond in the moment, were found to value the experience (Duff et al., 2020).

Jean Lave and Etienne Wenger developed the Situated Learning theory based on the idea that "learning occurs within authentic context, culture, and activity" and it "promotes the idea that students learn better in collaborative group settings and when the activities are based on real-life experiences". (Power, 2020). Learning is more than sitting in a classroom or listening to a lecture. Learning occurs through social interaction with peers and the environment. It is a process where knowledge is gained by having experiences that reflect life occurrences. Situated learning

was found to be considerably more successful in skill development than the traditional learning methods. (D'Souza, 2018).

Special Education departments are required to provide instruction in independent living tasks as part of the right to a Free and Public Education (FAPE), part of the Rehabilitation Act of 1973. The U.S. Department of Education (August 2020, p.8) states "all children with disabilities have available to them a FAPE that emphasizes special education and related services designed to meet their unique needs and prepare them for further education, employment, and independent living". A life skill program concentrates on developing independence with skills needed to function as an individual progresses into adulthood (Cronin, 1996, cited in Alwell & Cobb, 2009, p.83). A certified life skill program is a program that is deemed by the state to meet specific, state set requirements for transition planning. Despite passage of laws such as the Americans with Disability Act, the Individuals with Disability Education Act, and the Rehabilitation Act, individuals with disabilities continue to be fall behind those without disabilities in employment, social integration, and education. (White, 1997). This failure results not only in a lower quality of life for the individual, but also a burden on taxpayers. White stated "Recently in the United States, the high cost of not assisting these young people to make a transition to adulthood and be independent, successful contributing adults in society is being recognized" (1997, p. 697). Adults with disabilities have higher living costs and lower incomes, resulting in the need for state and federal financial support. For example, in New Hampshire, the cost of funding the Developmental Disability Services department has risen from $250 million dollars in the 2019 fiscal budget to a proposed $325 million dollars in the 2021 fiscal budget (New Hampshire Fiscal Policy Institute, 2019). In a 2020 joint report it was found adults with disabilities are "less likely to be employed than their peers without disabilities and, even among those who are employed, they have lower wages on average than those without disabilities" and "family members often reduce the amount they work to provide informal support to family members with disabilities" (National Disability Institute, p. 2). Life skill programs are essential to help adolescents with disabilities gain independence, which will also help alleviate taxpayer contribution to public programs. However, a survey completed by Meyers found special education staff, parents and school administrators agree life skill instruction is missing in public school programs. Teachers felt they were not trained and did not have the time to deliver life skill instruction (2011).

Literature supports the use of life skill programs with individuals with developmental disabilities (IDD) to increase function in the area of daily living skills, but there is not a proven nor established standard curriculum for life skill programs. Some studies recognized higher quality curriculum for individual skill instruction but the research provided little detail on how the instructional activities were chosen. Kingsnorth et al. (2007) indicated in their systematic review that the average length of intervention was multiple days per week for three to four months. However, the studies lacked data on a recommended intervention format and design. D'Souza highlighted the need for instruction of individuals with different cognitive levels to focus on methods that create transfer of skills across settings. (2018).

The literature indicated a paucity of current research on life skill programs with the majority being more than 20 years old. The findings supported the need for updated studies on the existence and format of life skills programs today. Very limited research exists with regard to life

skill studies in the high school setting. The studies described were completed in residential, community, and overnight camp settings (King et al., 2016; Kingsnorth et al., 2019; McPherson et al., 2016; McPherson et al., 2018; Sheppard & Unsworth, 2011). These settings are not representative of those places in which the majority of adolescents with developmental disabilities are educated.

The value of life skill programming is well demonstrated. Kingsnorth identified life skills as the fundamental skills needed for personal interactions and social relations needed to succeed in life (2019). AhmadiGatab et al. reported quality of life improves with ability to complete life skills, reporting "a significant relationship between the total score of life quality and the total score of life skills" (2011, p. 1980). Bouck (2010) found students with significant disabilities are capable of developing many daily living skills. Browder et al. summarized the existing data, stating "research offers strong support for teaching students with severe disabilities both academic content and functional life skills using systematic instruction" (2014, p.48). Guidelines on how to best formulate a life skill program, however, are missing. The literature supports the benefits of life skill programs but does not identify factors necessary to create an effective program. Alwell & Cobb stated "there is too much variability in the interventions and outcomes to render useful aggregate data" (2009, p. 89). Additional research needs to be gathered on format, instructional methods, and progress monitoring tools in order to create evidence-based life skill programs.

The purpose of this study was to understand the characteristics of current life skill programs and providers. Specifically, survey methods were used to identify respondents' perceptions of the program criteria with which they were familiar and as a means of collecting and using baseline data to guide programming. The author of this investigation worked to collect clear, relevant, and current data in the United States, identify trends in the prevalence and type of life skill programs currently offered in high school settings, and highlight areas which need additional study in order to establish a best practice approach to life skill program development.

Methods

One hundred special education providers were recruited through purposive sampling to participate in a descriptive survey to gather information on life skill program format and function. Purposive sampling was used to reach a knowledgeable sample base. Snowball/network sampling was encouraged to increase recruitment and survey participation. The survey was an online, anonymous questionnaire comprised of 50 questions. Questions varied in format with a mix of multiple choice, yes/no and open ended styles. Questions focused on demographics, workplace information, existing programs and suggested programs. Initial questions were piloted among peers and colleagues, and revisions were made based on feedback. Consent to complete the survey was acquired in the first question, and respondents also agreed to the use of information gathered in the study for future presentations and publications. The main variables in the survey were certified life skill programs, non-certified life skill programs, high school setting, and cognitive disability. Respondents were required to have knowledge of all of these variables to participate in the study. Participant inclusion criteria were limited to individuals who work/have worked in a public high school, have worked with individuals with cognitive disabilities, and have knowledge of the high school life skill curriculum/courses.

Exclusion criteria were set as individuals lacking exposure and knowledge of curriculum design and/or a life skill program in their workplace setting. The survey was distributed with an introductory message via social media and special interest sites. It was emailed to special education directors and special education providers across the United States. It was also distributed to the Occupational Therapy Associations of all 50 states and the District of Columbia. American International College Institutional Review Board (IRB) approval was received prior to the start of data collection.

Results

The survey yielded 101 responses, with 100 participants consenting to complete the survey. The primary roles of the respondents were occupational therapy practitioners (53%) and special education teachers (26%), with the remaining respondents reporting special education teacher or administration as the primary role. Respondents represent 27 US states, Washington DC, and the US Virgin Islands. Seventy five percent of surveys represent the public high school setting. Approximately half identified their location to be of middle socioeconomic status (42%), while 24% were of a diverse socioeconomic status, and 29% described the location as of low socioeconomic status. See Table 1 for further demographic details.

Table 1
Demographics of survey respondents

Category	**%**
Profession	
OT	56
Special Education Teacher	27
Case Manager	4
School Psychologist	1
Other	16
School Type	
Public High School	74
Charter High School	1
Private School	4
Alternative/Collaborative	7
Residential School	3
Other	11
School Location	
Inner City/Urban	8
Suburban/Town	47
Rural/Country	25
Regional High School	14
Other	6
Location Socioeconomic Status	
Low Socioeconomic Status	29
Middle Socioeconomic Status	42
High Economic Status	5
Diverse Population	24

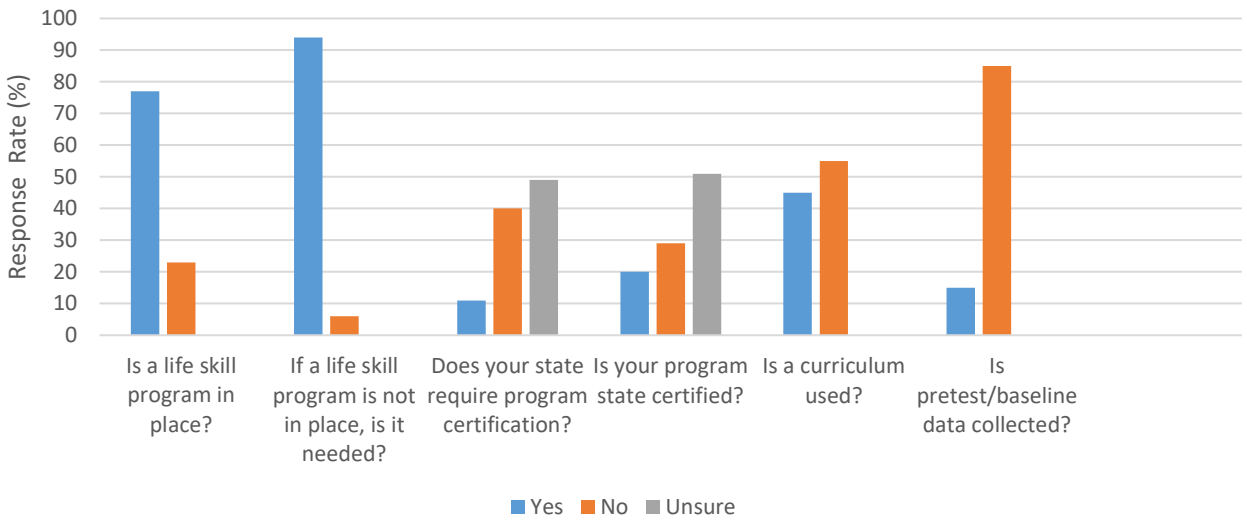
Of the survey respondents, 77 percent reported their high school had a life skill program. Of the 23% who did not have a life skills program, 94 percent felt a life skill program was needed. The most commonly identified reason for a lack of life skill programming was lack of budgeting/money. A lack of professionals needed to run the program (21%) and unknown (why a program isn't offered, 21%) were a close second to reported barriers as well. Of respondents only one, a special education administrator, felt a life skills program was unnecessary.
While life skill programs exist in 77% of the respondents' high schools, the criteria used to build the life skill program was unclear. Respondents were uncertain if state certification was required to be an official life skills program. Only 11% of professionals knew if their state required certification, while 49% were unsure. The majority of respondents (51%) did not know if the program in their high school was certified, and only 20% had knowledge of their program being identified as state certified.

There is no formula for determining how to best structure a life skill program. Survey results indicate 85% of life skill programs do not use a pre-test prior to their students entering the life skills program. Baseline data and student goals are not acquired. Of the life skill programs surveyed 55% did not use a curriculum for instruction. See Table 2 *Life Skill Program Data* for details.

Survey results indicate the life skill program is considered tailored to the individuality of students, with IEP goals being used to monitor progress. Progress is measured following IEP progress reports for 65% of respondents, with only 45% following a set curriculum. Pre-test assessments are used with only 15% of programs to gain baseline data, and similarly only 15% are using curriculum driven timed re-assessments. Completion of the life skill program is not typically reached based on goals, but more often by graduation. Only 5% of respondents reported students "graduate" from the program on goal completion, whereas 71% remain in the program until graduation. Programs are continuous rather than attainment based. According to the survey, curricula are IEP driven rather than life skill driven with 55% of programs not using a curriculum, and 83% address IEP goals as part of the program. These varied findings demonstrate the inconsistent application of methods and content used to teach life skills.

Table 2

Life Skill Progam Data



Discussion

Despite the changes in special education approaches and the increase in services in the school systems, life skill programming has not commensurately progressed since the early 2000s when the majority of significant research in this area of instruction was conducted. Occupational therapists, speech language pathologists, school psychologists, and transition case managers are equipped to provide relevant input on the needs, structure, and data collection procedures for an effective life skill program. Much of the research on life skill programming is 20+ years old, and the focus has not been on public school-based practice but instead on residential settings. With the emphasis of special education on inclusion and mainstream service provision, there is a clear need for updated research on life skill programs in the public school setting in order to provide evidence based practice as part of transition services under IDEA.

Life skill program coordinators appear to lack guidance from administration on what is or is not legally required, and program professionals have not been provided in-depth explanations of types or criteria for different levels of programs. Programs not only lack a clear identification of certified or non-certified categorization, they also lack a standardized approach. The quality and measurable outcomes of curriculum, assessment, progress monitoring and location all suffer from inconsistency as well.

Given that such a small percentage of programs are incorporating pre-test assessments and less than half of them are following a specific curriculum, an evidence based approach is lacking in life skill instruction. Programs are run more as an extension of the IEP than as a targeted, proactive intervention, with a clear paucity of measurable curriculum standards and baseline data collection to reflect student gains and severity of needs in these areas. Without baseline data collection, the question "How is skill attainment measured?" must be considered. Should life skill programming be separate from IEP goals? IDEA (2004) sets the expectation of "functional

life skill training curriculum". There is a disconnect between the goals established by IDEA, the strategies currently being used by administrators to measure progress in these objectives, and the instructional methods employed by special educators to implement best practice in achieving them. With such a large percentage of surveys indicating the absence of a specific life skills curriculum, are states in violation of IDEA (2004)?

Life skill instruction is needed in order to maximize independence in daily living skills. Additional research is needed to determine what is the best setting and with which methods, in order to create programs that meet student needs. There is an alarming uncertainty on the part of special education professionals on the requirements for program state certification and whether their own programs are state certified. This highlights a lack of understanding related to state compliance and regulations. More detailed information of what life skill programming should entail needs to be provided at the local, state, and national levels, in order to support providers in improving curriculum and instructional methods for better student outcomes. This can help providers structure a program using specific state criterion.

Limitations

Although 100 special education providers across the United States completed the survey, a quarter of respondents practiced in New Hampshire. The survey was developed by the author and did not clearly define terminology for "socioeconomic status" categories creating possible ambiguity in responses. Also, while the survey explored which special education professionals participated in life skill programs, it did not ask to what extent. Additional research on the role each professional takes in life skill programs would provide a better understanding of who participates and to what extent. More research is needed to determine best practice approaches to life skill program development and implementation for adolescents with cognitive disabilities including which skills to focus on, where the program should be offered, and the role of professionals outlined.

Conclusion

The purpose of this survey was to explore the uniformity of current life skill programs, identify how individuals are provided instruction in the daily living skills, and to discover common curriculum themes and standard program formats. This study an important discrepancy in life skill programs- there is a clear need yet programs are not using evidence based methods. Furthermore, this study indicates need for improved communication between administration and program service providers, for both adherence to state criteria and to strengthen transition services.

The results of this survey also emphasize the need for additional research in the area of life skill programs. It reiterates the sentiment of previous literature- more research needs to be completed in order to determine the gold standard approach for life skill programming. Current studies are needed, particularly in public school settings where schools are legally required to provide life skill instruction. Respondents in the survey overwhelmingly agreed on the need for life skill programs. This study illustrates a need for improved communication between administration and those implementing programs, including a requirement for use of an evidence-based approach. Defined program criteria with use of a consistent curriculum and baseline data collection would

contribute to a better understanding of the outcomes of participation in life skill programs. Additional research on the role of different professions, and how individuals can contribute, would provide a better understanding of how to develop an effective life skill program. More research is needed to determine best practice approaches to life skill program development and implementation for adolescents with cognitive disabilities including which skills to focus on, where the program should be offered, and the role of professionals outlined.

Life skill instruction is a required component of transition programming. As providers across diverse disciplines, we need to do better. We must strive to provide instruction based on individual's post-secondary goals, use data collection to measure progress, and follow an evidence based curriculum. This will provide the opportunity to reassess programming regularly, and allow providers to adjust based on proven results.

Declaration of Conflict of Interests

The author(s) did not state any potential conflict of interests.

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Facilitating Student Engagement Using Optimal Trunk Support for Children with Postural Dysfunction

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Abstract

Children with postural dysfunction experience difficulties keeping their bodies upright. Without appropriate trunk support, these children are not able to effortlessly control their head and trunk even for a short duration and could impact learning engagement. The purpose of this feasibility study was to examine if optimal trunk support enhances student engagement tasks (eye gaze, reaching, manipulation, head turn, and making choice), and if the student engagement varied between the initial and final measures for both the customized and usual devices over a six- to eight-week period. Video data of nine children from early intervention and K-12 were recorded and coded for student engagement tasks. Findings reveal significant improvement in student engagement when using the customized device. The average effect size for student engagement for the customized compared to the usual device in the initial and final measures exceeded 0.8.

Keywords: birth to adolescents, physical disabilities, Segmental Assessment of Trunk Control (SATCo), customized standers and sitters, intervention

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Facilitating Student Engagement Using Optimal Trunk Support for Children with Postural Dysfunction

Sufficient trunk stability is required to actively engage in a learning environment. Children who are non-ambulatory often have postural dysfunction that interferes with various basic functions like the use of the upper and lower limbs, (Bridgman, 2014; Shin, Song, & Ko, 2017*),* control of the head and trunk, maintaining sitting in a chair, reaching forward to pick up an object, and regaining upright control when balance is disturbed (Horn & Kang, 2012). Without appropriate support, the ability to effortlessly extend the body and use the limbs is a challenging task even for a short duration. These children expend so much energy to stabilize their trunk that they may replete their cognitive and attentional resources and have little left over to engage in the

classroom (Hadders-Algra, 2005). Lacking trunk stability, puts these children at a significant disadvantage for active engagement in the classroom compared to their nondisabled peers.

Under the Individuals with Disabilities Education Act (IDEA), orthopedic impairment category is assigned to students with postural dysfunction to receive special education services. Orthopedic impairment is defined as a bone-, joint, or muscle related disability that is so severe that it negatively impacts students' educational performance (IDEA, 2004). This term includes genetic abnormalities (e.g., missing an arm or a leg), diseases (e.g., poliomyelitis, bone tuberculosis), and other causes (e.g., cerebral palsy, fractures). To qualify for special education services, these children will be evaluated by healthcare professionals to determine their level of orthopedic impairment. Recognizing the challenges and difficulties imposed by their impairments for these students, Assistive Technology (AT) tools support is given to increase, maintain, or improve their functional capabilities in the classroom. Selecting appropriate AT will depend on the environment, the needs and abilities of the student, and the demands of the task that will enable the students to access, participate in and progress in the general education setting. In most cases, children with orthopedic impairments require physical accommodations or assistive technology (AT) tools such as standers and sitters as their legal rights under the Americans with Disabilities Act (ADA) and Section 504 of the Rehabilitation Act of 1973 to access the academic environment and participate in educationally related activities as part of an Individualized Education Plan (IEP).

School-based physical therapists work collaboratively with teachers and other school staff to aid students with orthopedic impairment in environment adaptations, acquiring, or modifying equipment or devices. The physical therapists provide services to the students based on the goals the physical therapists have for the students such as to improve students' ability to physically access the educational environment. The emphasis may be on adapting the AT tools for the students with orthopedic impairment to sit or stand upright, to promote range of motion, reduce contractures or improve movement transitions which have secondary but not primary impact on the educational goals in the IEP. In contrast, the teacher may be focusing primarily on students' access to the curriculum as stipulated in the IEP. Despite the goals the physical therapists and the teachers have for the students with orthopedic impairment, it is important to recognize if these students like their typically achieving peers are actively engaged in the classroom considering the fact that they are constantly trying to keep their body and head upright. Little is known about how AT tools for children with orthopedic impairment support their ability to engage actively in their classroom activities as required by their IEP goals. Although, AT tools are recommended and agreed upon in the best interest for the student in an IEP meeting that comprises educators, parents, and other related professionals, there remains a need to examine if the AT tools encourage student engagement. Our argument is that the AT tools provided to the students, customized or not, can highlight if they enhance or present difficulty for student engagement, but we also argue that a customized AT device for each individual student will provide valuable information on student engagement.

Student Engagement

Student engagement is any number of observable behaviors which are evident when students are motivated to participate in their learning environment (Bond, M, & Bedenlier, S., 2019). Related to school success, most studies use student engagement as a relevant framework to understand

students' observable behavior such as attendance rate, classroom participation, academic achievement, and student behavior (Gillies, Wilson, Soden, Gray, & McQueen, 2010; Fredricks, Filsecker, & Lawson, 2016). A complex construct to define, student engagement comprises three interrelated but distinct dimensions: (i) behavioral engagement (e.g., relating to effort, motivation, and participation in class and school) (BE); (ii) emotional engagement (e.g., relating to belonging, well-being at school, value of learning, and school identification) (EE); and (iii) cognitive engagement (CE) (relating to students' efforts, will, and goals directed towards learning; see Student Engagement, 2014, para.1). This definition was expanded to include students' involvement, connectedness, commitment, and motivation to learn (Rangvid, 2018). Another student engagement measure that has been examined is on-task behavior. Lee (2014) found on-task behavior to have increased academic achievement while Wand and Eccles (2012) found on-task behavior to result in fewer behavioral problems. However, these student engagement measures have been mostly used to study students who are physically abled. It is important to take into consideration that student engagement may look very different for children who have physical disabilities especially children with deficits in trunk postural control. Furthermore, no studies have empirically shown that student engagement leads to learning for children with deficits in trunk postural control. In the current feasibility study, student engagement is viewed as an on-task observable behavior on five tasks based on the participants' IEP/ and Individualized Family Service Plan (IFSP). The IEP is a legal document that is developed for each child between the ages of three to twenty-one in a public school that is eligible for special education. It describes the instructions, supports, and services each child needs to make progress and meet grade-level goals. Similarly, the IFSP is also a written document for children below the age of three that describes the current level of development and the services needed to support both the child's development and family's efforts to achieve the outcomes.

Learned Helplessness

For children with trunk deficits, their attention in the classroom is divided across two functional activities that must be performed simultaneously: (i) keeping their trunk upright, and (ii) focus on learning. Since both tasks require much effort, a decrement might occur in one or both the activities. Limited success in staying upright to engage in learning may lead to a pattern of learned helplessness for children with trunk dysfunction (Horn & Kang, 2012). Learned helplessness is a feeling of objective helplessness with respect to negative effects of an outcome in any given situation. Repeated unsuccessful experiences bolster feelings of helplessness and may reduce the intrinsic motivation to be self-determined for children with trunk dysfunction (Brown & Cohen, 1996). These students would feel too overwhelmed and believe that it is futile to put in any effort because they will not be able to accomplish the given tasks. Given that postural control is a fundamental pre-requisite for these children to maximize their educational experience and success, it is important to keep their bodies upright to perform the five tasks examined in this study to overcome any development of learned helplessness.

Assistive Technology

Children with trunk dysfunction often face barriers to accessing and participating in the classroom. One recommendation that is usually made during the IEP meeting is to provide an AT tool to compensate for students' skills deficits by increasing, maintaining, or improving their functional capabilities. AT uses the universal design for learning (UDL) to increase

accessibility, ensure equal access to educational opportunities, and support inclusive classrooms. In general, AT is any item, piece of equipment, or software program used to compensate for functional limitations in completing a range of tasks. For children with trunk dysfunction, AT devices or tools are designed to improve their physical functioning or reduce the environmental barriers that impede the activities and routines in everyday settings. AT can subsequently increase the independence, participation opportunities, and quality of life for children with disabilities (Campbell & Wilcox, 2004; Mistrett, 2004). Some AT devices for positioning and mobility are canes, walkers, crutches, wheelchairs, sitters, and standers. Interventions using AT devices as mandated by the IDEA can level the playing field for children with trunk dysfunction.

The AT devices can be customized to improve the functional capabilities of children with disabilities. Cook, Richardson-Gibbs, and Dotson (2016) emphasize that environmental adaptations such as special chairs that support the optimal position of the trunk can ensure a stable position for children with trunk dysfunction. Otherwise, most of the child's energy and attention will be spent on maintaining balance instead of engaging in learning. While AT devices can produce beneficial outcomes for children with disabilities, it also shows that it is far from always successful (Ostensjo, 2009). Inadequate adaptation and ineffective use of AT devices to the situation and routines of the child are factors associated with unsuccessful outcomes. As a result, the AT devices are sometimes abandoned because they are inappropriate or difficult to use, and inappropriate recommendation of AT services to meet the needs, preferences, and strengths of a child with trunk dysfunction (Bausch & Ault, 2012).

Recent developments in physical therapy have shown it is possible to quantify partial levels of postural control by systematically assessing discrete levels of the trunk using the clinical evaluation tool, Segmental Assessment of Trunk Control (SATCo). This method offers a level-by-level assessment of where the trunk control difficulties are present (Butler et al, 2010). The information on where children lose control of the trunk can be used to target positioning and intervention strategies to provide trunk support at the student's functioning level. This contrasts with the traditional focus on the entire trunk as a single unit and ignoring the fact that the trunk is made up of many muscular and skeletal subunits (Butler et al., 2010). This new level of specificity in evaluating trunk postural deficits provides increased specificity for individual customization of support devices.

Laboratory research has demonstrated effectiveness of increased specificity of trunk support on posture and reaching in typically developing infants and in non-ambulatory children with cerebral palsy (Rachwani et al, 2015; Saavedra & Woollacott 2015; Santamaria et al, 2016). However, the understanding, if increased specificity of adaptation for AT in the classroom will carry over to meaningful student engagement is unknown. Theoretically, providing more specific support to posture control would demonstrate improved posture control and ease of movement to engage in classroom activities, but there is no data yet that demonstrate this relationship in a real-world environment. The current feasibility study is the first to explore the effects of specificity of trunk support based on SATCo to student engagement in non-ambulatory children with postural deficits. This feasibility study examines the types of specific adaptations to current classroom equipment, the impact on student engagement, and effect sizes for

expansion of these ideas for larger studies, as well as initial exploration of barriers (factors that limit use) and facilitators (factors that enhance use) of these type of devices in the classroom.

Purpose of the Study

The current feasibility study is not attempting to directly link postural support with better learning outcomes. However, it is connecting more effective postural support with more effective student engagement. Studies have shown that student engagement is key to student learning. By connecting postural support with student engagement, this feasibility study is providing a path to linking postural support with better learning outcomes.

Recent laboratory research has shown the benefit of segmental support based on the level of trunk control available to the child (see Santamaria, et al., 2016). Benefits have been shown for posture and reaching in the laboratory however these measures fall within the World Health Organization International Classification of Function areas of body structure and function and activity, but it is not known if improvements would affect student engagement in general.

The present feasibility study aims to examine the effect of postural support based on SATCo and principles of segmental positioning, on student engagement in the classroom. Five measures of student engagement based on the IEP/ and IFSP goals were used to analyze the data. The following questions guided the research: (1) Does the customized device show an improvement in student engagement compared to the usual device for both initial and final measures; (2) How does student engagement vary between initial and final measures for both the customized and usual devices? (3) How often did the students use the custom devices? (a) What factors influenced usage? (b) Was there a relation between usage and subjective or objective performance changes?

Method

Participants

This feasibility study is constrained to a small sample size because students with postural dysfunction represent a narrow segment of children with severe physical disabilities. However, the small sample size would provide pilot data and meaningful insights for this student population. According to IDEA, orthopedic impairment disabilities is one of the categories of low incidence disabilities with an expected incidence rate that is less than 1% of the total statewide enrollment in schools. Additionally, the heterogeneity of the population with varying primary and secondary deficits makes it difficult to find participants from the same age group or severity.

A sample of ten children diagnosed with postural dysfunction from one Public School District and two Birth to Three program sites in a Northeastern state of the U.S.A. were invited to participate in the research project. Participants were recruited through referral from physical and occupational therapists working in the school district or Early Intervention programs. Participation was limited to children who (a) were unable to sit independently for three minutes with hands free, (b) were enrolled in Early Intervention, preschool, or kindergarten through 12th grade in the participating school district or Birth to Three program, and (c) whose parents responded by giving consent for the child to participate in the research study in their classroom.

Children who were blind or had spine or lower extremity surgery within the past six months were excluded.

Demographic data of the children whose parents and therapists agreed to participate are presented in Table 1. SATCo scores indicate the level of the trunk where the child demonstrates upright control. While the Gross Motor Function Classification Scale (GMFCS) is the international standard for classifying the severity gross motor function of cerebral palsy, these measures were also used to classify participants with other diagnoses for functional comparison purposes. The Manual Ability Classification Scale (MACS) was also developed specifically for children with cerebral palsy (CP), but it was used to describe the level of manual ability for all participants regardless of their diagnosis.

Measures

For the purpose of this study, student engagement measures are selected from the learning goals documented in the participants' IEP and IFSP. The five measures identified are eye gaze, reaching, object manipulation, head turn, and making choices. Eye gaze refers to the children's ability to consciously control gaze and explore their surroundings by directing their eyes to objects or the adult working with the child. Reaching is the child's ability to move the arm and hand towards an object. Manipulation refers to touching, holding or using an object manually and using the object as intended. Head turn refers to the child's ability to stay upright without the head falling forward or backward to look at the adult or at the object shared with the child. Making choices is when the children use reach, hand swipe, or object manipulation based on teacher- or individual- directed choices. Each time the child has eye gaze on the task at hand, reaches for the object, manipulates the object, makes head turns, or makes choices, they will be considered as being engaged. These observable on-task behaviors as documented in the IEP and IFSP are indicators of student engagement because the tasks are designed to encourage active participation.

Table 1

Participant Characteristics

Age (years)	Gender	School Setting	Diagnosis	GMFCS Level	MACS Level	SATCo	IEP or IFSP goals
2	M	Early Intervention	HIE, Mixed Spastic Athetoid Cerebral Palsy	IV	V	No Head Control	Goal 1: **eye gaze** to look at people or objects Goal 2: **reach** and touch objects with 1 or 2 hands Goal 3: use **eye gaze** to make a choice
3	M	Early Intervention	Cerebral Palsy-Spastic Diplegia	IV	II	Mid Thoracic	Goal 1:**manipulate** objects using one or two hands Goal 2: interact with others through e**ye gaze, reach** or touch Goal 3: transition to and from sitting or standing*
5	M	Elementary-Special Education	Metabolic Disorder, Hypotonia	V	IV	Head Control	Goal 1: pick up, release, or **manipulate** objects. Goal 2: engage in **reach**ing out activities while upright.
6	M	Elementary-Regular	Cerebral Palsy	V	V	Upper Thoracic	Goal 1: uses **eye gaze** for **choice**s Goal 2:uses **reach** or hand swipe for choices (if not given teacher directed choices, can count individual choice if he reaches and manipulates)
7	M	Elementary-Regular	Autism, Tetrasomy 18p	IV	III	Lower Thoracic	Goal 1: point or swipe to make a **choice** Goal 2: **manipulate** objects with one or two hands

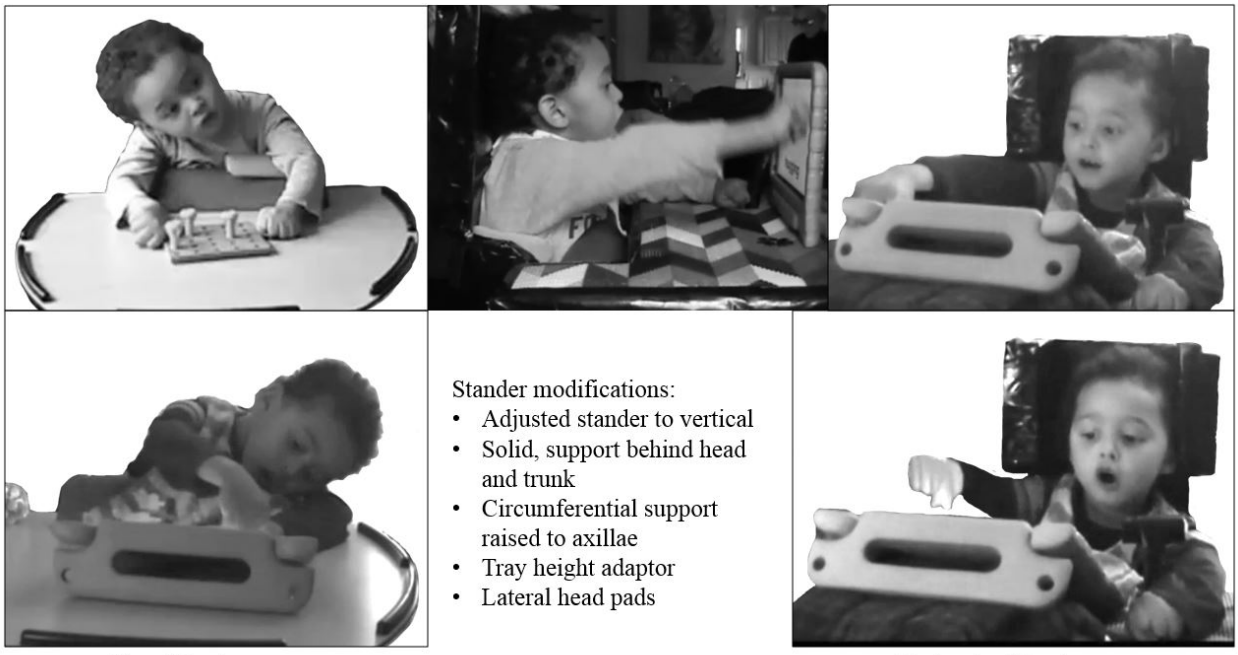
							Goal 3: **manipulate** objects while standing
8	M	Elementary-Special Education	X-linked dev delay, hydrocephalus, VP shunt, hypotonia	V	IV	Mid Thoracic	Goal 1: pick up, release, or **manipulate objects.** Goal 2: sort objects into containers* Goal 3. Follow directions by giving or taking object on request*
9	M	Elementary-Special Education	Hydrocephalus	V	IV	Upper Thoracic	Goal 1: use 2 hands for activities (**manipulation**) Goal 2: looking at or tracking other people (**eye gaze)**
10	M	Elementary-Special Education	Seizure disorder, Cerebral Palsy	V	IV	Head Control	Goal 1: pick up, release, or **manipulate** objects. Goal 2: sustained visual attention on picture or object as directed by teacher **(eye gaze)**
19	M	High School-Special Education	Cerebral Palsy-Spastic Quadriplegia	V	V	No Head Control	Goal 1: **eye gaze** on object or person Goal 2: **head** facing forward, **turn**ed to right or actively turning

Note. HIE= hypoxic-ischemic encephalopathy; GMFCS =gross motor function classification scale; MACS = manual ability classification scale; VP ventriculoperitoneal: GMFCS Level II = Children may require physical assistance; a handheld mobility device or use wheeled mobility over long distances and they have minimal ability to perform gross motor skills such as running and jumping; GMFCS Level III = Children walk using a hand-held mobility device, use wheeled mobility when traveling long distances, or may climb stairs holding onto a railing with supervision or assistance; GMFCS Level IV = Children may walk for short distances at home with physical assistance or use powered mobility or a body support walker when positioned and require a manual wheelchair or use powered mobility; GMFCS Level V = Children with limited ability to maintain antigravity head and trunk postures and control leg and arm movements, and uses a manual wheelchair with assistance for mobility in all settings. * behavior was not able to be coded across all sessions because it was not provided during all sessions

Devices

Usual Device. The usual device such as floor sitters, upright standers, and wheelchairs is the device recommended and documented in the IEP and IFSP to cater for the needs of each individual child. For example, a floor sitter offers support in seating a child at floor level which allows the child to be independent with hands free for use while maintaining erect trunk alignment. The upright stander is a device that allows for a fully upright standing position and is appropriate for children with mild to moderate physical impairments who have good head control, and some trunk control.

Customized Device. The customized device adaptation varied based on the child's level of trunk control, observation of the child in their usual device, the IEP or IFSP goals, and requests from teachers or therapists. Device adaptations were focused on maximizing the child's potential for upright vertical control and freedom of movement by creating positioning contexts that would support active posture control simultaneous with task performance. Two primary types of modifications were made. For children in stationary seats or standers, the principles of segmental support involve stabilizing the pelvis in vertical alignment, offering firm lateral/anterior and/or posterior support to the trunk based on the child's SATCo level, providing a raised tray if necessary for vertical upper trunk alignment and adding a vertical surface behind the head if necessary for vertical head alignment (see Figure 1 for examples from two children with similar levels of trunk control at different ages). The second type of device that was created for four of the children was a custom sit to stand box (see Figure 2). For these children the device allowed the child to practice postural transitions and have autonomy to move independently.



Usual Device

Customized Device

Figure 1: Examples of two children of different ages who each demonstrate segmental deficit in trunk control at the level of head control. 1a: Images are of a 2 year-old child with CP in his usual device (*left side*), modifications (*center*) and customized device (*right side*). This toddler showed marked increase in attempted reach frequency and duration in the custom device. **1b:** Images of a 19 year-old adolescent with CP using his usual devices *(left side),* device modifications *(center)* and improved head turn and eye gaze with custom device adaptations *(right side).* This adolescent showed marked increase in head turn right and visual engagement in the classroom.

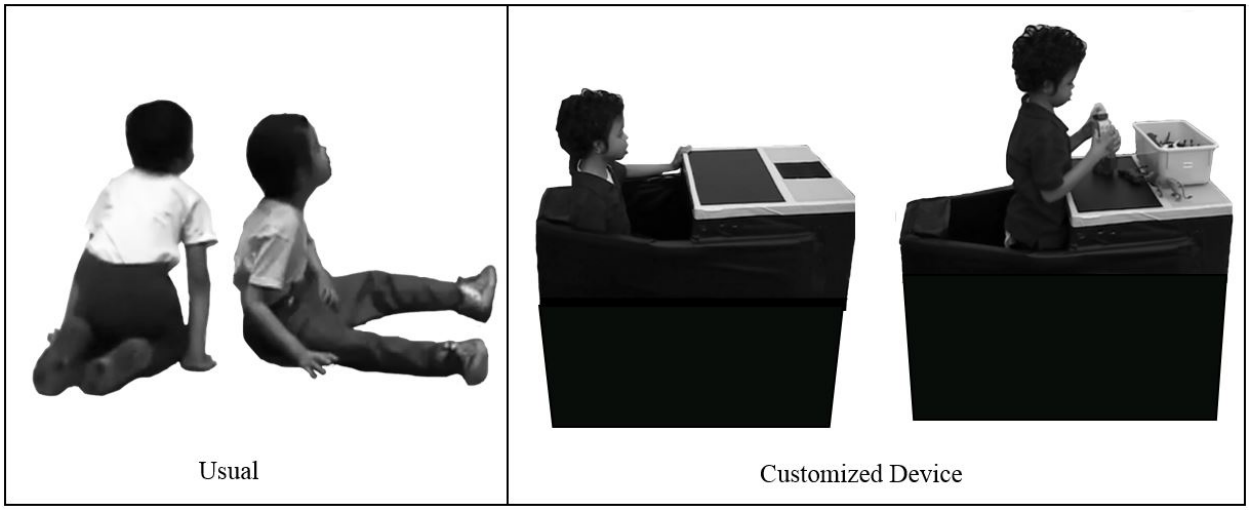


Figure 2: Example of a child who used floor mobility in the classroom (*left side*) and his posture and autonomy with transitions and standing activities using a sit to stand box (*right side*).

Materials used to adapt the usual devices included duct and/or Gaffer's tape, Polyvinyl chloride (PVC) piping, cardboard (heavy duty cardboard that is used for shipping adaptive equipment), pool noodles, and yoga mats or contact paper to protect surfaces. Custom adaptation included tray height adapters, pelvic stability straps, neoprene and velcro foot straps, and backboards.

Procedure

The feasibility study used a prospective longitudinal design to assess the effect of optimal segmental trunk support on student engagement in the classroom. Nine children completed the protocol. One child dropped out due to the need for surgery to remove hardware from her hip. Two children were enrolled in the study when they were in early intervention. For those two children, the data collection and customized device were used in the participants' home. The other seven children were seen in their classroom or therapy rooms at their school. Appointments were scheduled to coincide with request from teacher and therapist and were held on the same day of the week and same time of day as often as possible. Seven children had initial and final measures at the same time of day and the same day of the week. Two children (02BF and 03CM) had their final measure on the same day of the week but slightly later in the day than the initial measure.

Initial Appointment. The participants were observed in their usual device. This is followed by a SATCo assessment and completion of the GMFCS and MACS in consultation with the school therapist. The researchers consulted with the school therapists (mostly physical therapists and one occupational therapist) and classroom teachers for input to determine the best choice of device and type of customization for use in the classroom.

Fitting appointment(s). During the second visit, the researchers brought a new device or adaptations for the child's current device for appropriate fit and function. Once the device was customized appropriately, the therapists and/or teachers/parents were educated on safety and use of the customized device. Video data were recorded in the classroom for a duration of 10 minutes each with the child using the usual and then the customized device. The researchers worked directly with the child's school therapist. They trained the therapist, observed the therapist putting the child in and out of the device and provided handouts if needed to assist the therapist in instructing and supervising the classroom staff. The school therapist then acted as primary supervisor for use of the device in the classroom and determined when and if they would train the classroom teacher and staff. For the two children in EI, the researchers simultaneously trained the parent and therapists and asked the parents to demonstrate putting the child in and out of the device. One preschool teacher (for child 04DR) was trained by the school therapist but also sought additional feedback from researchers regarding device set up.

Intervention Period. During this period, the therapists and teachers/parents used the customized device in the educational setting for a minimum of six weeks. Data logging charts were left with each device for tracking of days and time the device was used and for therapist or teacher comments about the child's response to the session. The researchers had intermittent

email and/or phone communication with the therapist during this time to follow up on device usage and address any concerns about the equipment. Table 2 presents device usage report summaries for 10 children (one of whom later dropped from the study due to need for hardware removal from her hip).

Table 2:
Device Use Data

ID #	Total min	Total Freq	Weeks reported	Minutes per session	Freq per week	Device type	Child Affect	Subjective evaluation of performance	Device donning and doffing	Timing for use of device
01_AB	82	8	3	10.25	2. 67	Stander with tray adapt	Negative	None noted	PT/Aide only	PT schedule
02_BF	529	20	8	26.45	2.5	Sit to stand	Positive	Positive	PT and classroom staff	PT schedule
03_CM	515	9	5	57.22	1.8	Stander with tray adapt	Positive	Positive	PT only	PT schedule
	270	7	5	38.57	1.4	w/c adapt	Positive	Positive	PT trained staff at 6 weeks	PT schedule
04_ DR	790	26	7.5	30.38	3.47	Floor sitter	Positive	Positive	Teacher/aides trained by researchers and PT	Academic routine
05_EM	407	12	6	33.92	2	Sit to Stand	Positive	Variable/positive or neutral	PT only	PT schedule
06_FS*	85	7	5	12.14	1.4	Floor sitter	Negative	Negative	PT only	PT schedule
07_GA	2690	25	8	107.6	3.125	Sit to stand	Positive	Positive	Classroom staff	academic routine
08_HH	375	9	2	41. 67	4.5	Stander with	Positive	Positive	Only PT or parent not by	Parent schedule

						tray adaptation			daytime caregiver	
						Sit to stand	Positive	Positive	child independent	Daily routine
	no records								Parent trained and practiced	Parent daily routine
09_IM						Chair adapt	Positive	Positive		
10_JS	293	8	4	36.63	2	Floor sitter	Positive	Positive	PT only	PT schedule

Note. Data from device use data sheets. Min= minutes, Freq = frequency, PT = physical therapist, child affect and performance are based on comments written on the data sheet. * indicates the child who withdrew from the study due to need for removal of hardware from previous hip surgery.

Follow-up Appointment. After at least six weeks access to the customized device, the researchers returned to the classroom or other educational setting and collected video data for 10 minutes in the usual device followed by 10 minutes in the customized device.

Data Coding

Video behavior coding was performed by two undergraduate student researchers using Datavyu (www.datavyu.org), an open source, computerized video coding tool. The students coded the videos for "on task," "off task," and "task unavailable" behavior for each participant's specific IEP and IFSP goals. Each video was coded by two students (primary and secondary coders). The primary coder assessed all video data frame by frame. The secondary coder assessed 25-50% of each video for reliability. Reliability ranged from 80% to 98% agreement for individual goals for individual children. The overall reliability across all children and all goals 93.64%. The percentage of on-task data was analyzed to compare differences in student engagement between usual and customized devices.

Data Analysis

The on-task duration for each of the five tasks was measured as initial and final measures for each student on both the usual and customized device. This resulted in a maximum of 10 pairs of observations for each student: one for each of the five tasks for the initial measure and one for each of the five tasks for the final measure for the nine students. The effect size was determined for each of the five tasks for both the initial and final measures.

To compare the level of improvement of on-task duration between the customized and usual device in aggregate, the average on-task duration was analyzed instead of individual scores. This approach provided more meaningful patterns on the effectiveness of the customized device for both the initial and final measures to overcome the small sample size used in this study. Two kinds of aggregate analysis were used: (a) the ratio of on-task duration between the customized device and standard device for the initial and final measures; (b) the ratio of on-task duration between the final and initial measures separately for the customized and usual device. Both kinds of aggregate analysis were done separately for the five tasks of student engagement. To analyze the impact of time in both the customized and usual device on student engagement, for each task, the ratio (percentage improvement) of the average duration between the final and initial measures was determined.

Preliminary analysis of barriers and facilitators was conducted by reviewing mean values for data from Table 2. Means and standard deviations were calculated for total minutes reported per week, minutes per session and frequency of device use per week for three different conditions (i) who placed the student in and out of device (PT versus classroom staff), (ii) when the device was used (academic schedule versus PT schedule), and 3) subjective comments on student behavior (positive versus negative or neutral). Statistics were not completed for these due to small numbers of students and reliance on subjective reports from classroom use.

Results

Descriptive Analysis

Age of the nine participants in the pilot study ranged from 2 to 19 years with a mean age of 10.5 and a median age of 7 years. Not all students were coded for all the five student engagement tasks (eye gaze, reach, manipulate objects, head turn, and making choices) because

the IEP and IFSP goals for each student were associated with different student engagement tasks. For the head turn task, the mean difference between customized device and usual device in the initial and final measures and the effect size were not computed because these data were collected for only one student. Consequently, the effect size could not be calculated for the head turn task.

Improvement in Student Engagement between Usual Device and Customized Device

The effect size was calculated for four of the tasks (eye gaze, reach, manipulate objects, and making choices) that represent student engagement. Table 3 shows that the effect size is positive for all the four tasks which implies that the customized device always results in higher on-task duration values compared to the usual device. Furthermore, on average, the effect sizes across all four tasks (d = 2.54), in the initial measure and 0.93 in the final measure exceed Cohen's (1988) convention for a large effect (d = .80). This finding indicates significant differences between the customized and usual devices. The effect size also varies by task between the initial measure and the final measure, and it is generally lower for the final measure compared to the initial measure. Effect sizes exceeding 1.0 are indicated in the initial measure for making choices and reaching and for manipulation in the final measure.

Table 3

Effect Size on Difference in On-Task Duration between Customized Device and Usual Device in the Initial and Final Measure

	Initial Measure			Final Measure		
SE	Mean	SD	ES	Mean	SD	ES
Eye Gaze	112	214	0.52	11.37	24.03	0.47
Reaching	7.60	6.70	6.68	7.89	11.50	0.69
Manipulation	27.66	47.97	0.58	16.09	7.45	2.16
Head Turn	NA	NA	NA	NA	NA	NA
Making Choices	9.20	3.88	2.37	1.29	3.28	0.39
Average Effect size			2.54			0.93

Note. Mean, standard deviation and effect size is not applicable for Head Turn because there was only data for one student on this task.

Impact of customized support on the five measures of student engagement

Table 4 reports the improvement level of the on-task mean duration of the customized device over the usual device for the five measures of student engagement. The on-task mean duration for the customized device is always higher than the usual device for both the initial and final measures. Interestingly, the improvement level (ratio of customized device over usual device) is greater for the initial measure compared to the final measure for each of the five measures except for head turn. In the initial measure, the customized device shows the greatest improvement over the usual device for eye gaze and the least improvement for head turn. On the other hand, in the final measure, the customized device shows the greatest improvement over the usual device for head turn, and the least improvement for eye gaze. The overall average improvement for measures of student engagement is greater in the initial measure

(2.96) compared to the final measure (1.65). Also, the same task that showed the highest improvement level in the initial measure did not show the highest improvement level in the final measure. For example, eye gaze had the highest level of improvement (6.97) in the initial measure but the lowest in the final measure (1.13).

Table 4
Improvement in On-Task Mean Duration between Customized Device and Usual Device for the Initial Measure and Final Measure

Task	Initial Measure Ratio	Final Measure Ratio
Eye gaze	6.97	1.13
Reaching	1.79	1.34
Manipulation	2.36	2.23
Head Turn	1.70	2.40
Making choice	2.00	1.15

Note. Calculation: Initial average value for customized device (x) divided by initial average value for the usual device (y). A similar calculation was done for the final measure ratio.

Table 5 reports the improvement level for on-task duration between the initial measure and the final measure for both the usual and customized device. The usual device shows bigger improvement in the final measure compared to the customized device except for head turn. For the usual device, the biggest improvement is reaching while for the customized device, the biggest improvement is head turn.

Review of device usage data from Table 2 shows that data records varied from no record (one EI parent) to 8 weeks of data. Mean and standard deviation were calculated to explore differences in frequency and duration related to potential barriers and facilitators. The total minutes reported per week, minutes per session or frequency per week did not differ significantly between those students who were placed in the device by PTs (minutes per week (M=101, SD =70); minutes per session (M=41, SD = 24) and sessions per week (M=2.4, SD =1.2) compared to those who were placed in the device by classroom staff (minutes per week (M=134, SD =138); minutes per session (M=44, SD = 44) and sessions per week(M=2.9, SD =.4). There was a difference between the number of weeks data were reported for students who used the device according to PT schedule (M=4.7, SD=1.9) and those who used the device as part of the academic routine (M=7.8, SD=0.4). Subjective comments on the device record regarding student behavior (affect or performance) showed differences related to minutes/week and minutes/session. Negative comments or no comment about affect or performance resulted in minutes per week (M=22.2, SD=7.3) and minutes per session (M= 11.2, SD = 1.3) used the devices less than those with positive comments that resulted in minutes per week (M=142, SD=97.7) and minutes per session (M= 50.7, SD = 30.5).

Table 5
Improvement in On-Task Duration between Initial and Final Measures for Both Usual and Customized Device

Task	Usual Device	Customized Device
Eye gaze	2.21	0.36
Reaching	2.34	1.75
Manipulation	0.76	0.71
Head Turn	1.51	2.13
Making Choices	0.90	0.52

Note. Calculation: Value from the average final measure for usual device (x) divided by value from the average initial measure for usual device (y). Average final measure value for customized device (x) divided by average initial measure value for custom device (y).

Discussion

While this was a small study, our goal with this first step was to determine if specificity of support based on segmental level of trunk control could make a difference in student engagement and what factors might influence implementation of customized device use in the classroom. Current findings indicate that each student engagement measure shows higher scores for the customized device compared to the usual device in both the initial and the final measure. The effect size analysis further strengthens our findings that the customized device improves student engagement in both the initial and final measures. We also found that immediately observable improvement in child affect or performance and using the device as part of the academic routine are both important factors for implementation.

The findings also reveal that students had some postural control when they were placed in the usual device, but the support was not optimal. Consequently, the usual device limited these children's ability to stay upright for a longer duration in eye gaze, reach, manipulate objects, head turn, and making choices. The effect of adapting the usual device showed a huge improvement for these children in these five measures. The adaptations provide a more stable posture control and balanced position and give control back to these children to engage in learning. Consistent with findings from Cook et al. (2016) and Bausch and Ault, (2012) studies, it appears that an AT device can provide increased independence to improve the functional performance only when it meets the needs of the children with trunk dysfunction. It is important for the IEP team to establish responsiveness of trunk control to address constraints and limitations imposed by the AT devices. The clinical evaluation tool (SATCo) provides information on how much adaptation can be made to the AT devices to address more specific needs of these children.

When comparing the usual device by itself in the final measure, the biggest improvement was for reaching and eye gaze while both manipulation and making choices showed a decrease over time. In contrast, for the customized device, the biggest improvement was for head turn and reaching while there was a decrease in scores for the making choices and manipulation measures. On average, the usual device showed a 1.54 improvement in scores across all five measures in the final measure in contrast to only 1.1 improvement for the customized device.

One possible reason for this unexpected finding that the impact of the customized device was predominantly realized in the initial measure and did not improve much over time. In fact, eye gaze which has the highest ratio of 6.97 over the usual device in the initial measure, shows the lowest ratio of further improvement (0.36) for the customized device in the final measure.

The use of customized device has maximized eye gaze in the initial measure. The improved eye gaze can dramatically increase the amount of environmental information a child can intake. More importantly it increases the teacher's recognition of the child's engagement in the classroom and the teacher's capacity to provide a stimulating environment for the child. The child may have reached a ceiling effect for the customized device limiting further increases. Improvement over time was only found in the usual device.

There is strong evidence in ambulatory children with cerebral palsy that learned helplessness for a hemiplegic arm can be alleviated through forced use or constraint induced methods that encourage children to increased use of their more neglected arm. In the case of the participants of this study, they might not have been aware of the affordances for improved function until they experienced them in the customized device. This could have carried over to their usual device with increased motivation and self-efficacy.

In future studies, prior to introduction of the customized device, a control group or multiple base line design should be developed. Findings in this study, despite preliminary, are encouraging and indicate that adapting the usual device could be considered a valuable procedure to increase engagement in children with the most severe postural dysfunction. The immediate change in performance seen on the first introduction of the customized device indicates that usual devices might not be effectively tapping into the child's capacity for upright control and engagement in the classroom.

Once the children can control their trunk in sitting and standing positions, their arms are free for exploration and functional activities. If students continue to struggle in supporting their trunk, it can often lead to feelings of learned helplessness. When a child makes effort to stay upright but loses control, they may end up feeling they have no control over their body and will stop trying. Their poor performance may lead them to think that their effort is wasted and may lose the motivation to stay engaged. More importantly, if a child does not have adequate postural control to remain in a functional position, they may have to choose between posture and task performance with some tasks not being possible. It is interesting to note that the strongest improvements in the usual device were for eye gaze and reaching, both of which can be achieved from poor postural alignment whereas making choices and manipulating objects may require the ability to hold postural orientation while engaging in the task. It is unknown whether the dramatic improvement in these tasks in the customize devices served as motivation to attempt more in the usual devices. Future studies should collect control data to determine if the experiences in the customized devices have carry over effects to the usual device.

To the best of our knowledge there are no publications reporting educational interventions focused on student engagement in non-ambulatory children with postural dysfunction. Still, according to the existing literature, environmental adaptations to AT devices can ensure a stable position for the children with trunk dysfunction (Cook et al., 2016; Goodworth et al, 2016;

Santamaria, et al., 2016). The findings, while preliminary, suggest that optimal trunk support is yet another factor to improve student engagement.

An important issue emerging from these findings is that with optimal trunk support, children with trunk dysfunction could be taught alongside their peers in schools in an inclusion classroom. It is important to understand that this study used five student engagement measures based on IEP and IFSP goals to compare the customized device over the usual device. Because there is no consensus as to which measures are appropriate to examine student engagement, future studies may want to consider extending the student engagement measures beyond the IEP goals.

The findings for device use records suggest that care must be taken to be sure the modifications are working well for the child, that the classroom staff and teachers are trained to use the device so that it can be used as part of the academic routine.

Implications for the Implementation of the Usual and Customized Devices

The findings in this study have important implications for the continued use of customized devices to support students with poor postural control to better engage in the classroom. The effect size was positive for all comparisons of mean on-task duration between the customized device and usual device for each of the five tasks and for both the initial and final measures. These results could strongly imply that adapting the AT devices to meet each student's unique need to sit or stand upright could significantly improve student engagement. Often students with trunk deficits are placed in devices that do not provide them sufficient support to keep them upright. Because there is limited research on trunk support and student engagement, this pioneering study could imply that conducting an experimental study with a larger sample size and measuring all the five student engagement tasks for each of the student using multiple data points may provide important insight into adapting AT devices to meet students' needs. Students who are well supported are better able to interact and engage with others and may have better opportunities to carry out similar cognitive tasks with their nondisabled peers.

Limitations and Future Research

Since this is a feasibility study, there are several limitations that suggest directions for future research. One major limitation is the small sample size. It can produce false-positive results, or over-estimate the magnitude of an association. When using statistical analysis to examine the rate of improvement in the initial and the final measure by each IEP or IFSP goal for each student, the analysis may fail to produce sensible results, or they may produce unreliable results.

There are challenges for this population due to heterogeneity. Future studies using single subject designs may be helpful to overcome the heterogeneity of participant's age, physical, cognitive and educational needs and backgrounds. Future studies should also replicate this feasibility study using a larger sample size to give more reliable results with greater precision and power. With a larger sample size, it may be possible to analyze results by specific age or grade-level student categories. Additionally, data should be coded for all the five student engagement tasks for all the participants in the study to ensure reliable findings. Fidelity

measures should also be used in future studies to more specifically identify dose and barriers or facilitators to implementation.

Conclusion

Postural control is a fundamental pre-requisite for a child to keeping their bodies upright to competently perform skilled movements and complex motor skills. With optimal trunk support, they can be engaged in learning and make meaningful progress toward achieving their IEP and IFSP goals. In the current feasibility study, optimal adaptations were made to the usual device or a new optimal device was created for children with trunk dysfunction to provide them a more stable position using eye gaze, reaching, object manipulation, head turn, and making choices. Our findings, despite preliminary and in need of further research, show that providing optimal trunk support offered participants to be on-task for a longer duration for the five measures of student engagement that were analyzed.

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The Impact of a Special Education Course on Pre-Service Teachers' Knowledge and Perspectives about Inclusion and Inclusive Practices

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Abstract

The purpose of this study was to examine the effect of a Special Education course on pre-school teacher candidates' knowledge levels and perspectives towards inclusive practices as well as their willingness and self-confidence about working in an inclusive classroom. The single group pre-test- post-test design was conducted to see whether there was a change on the dependent variables. The study group consisted of 58 teacher candidates from a preschool teacher education program. The results of this study indicated that there was a statistically significant difference between the knowledge of the participants from the pre-test to post test. Based on the post-test results, teacher candidates' willingness and self-confidence were significantly higher than the pre-test results. Limitations and implications for practice are presented.
Keywords: special education, teacher education, early childhood, inclusion

The Impact of A Special Education Course on Pre-Service Teachers' Knowledge and Perspectives about Inclusion and Inclusive Practices

Early initiatives towards inclusive education practices started in the middle of the 20th century (Dunn, 1968; Hornby, 2014), and the first international step was taken with the Salamanca Declaration (UNESCO) regarding the importance and necessity of inclusive practices, suggesting that students with and without disabilities can benefit from the same educational activities in the same schools. The release of the Salamanca Declaration in 1994 has led countries around the world to make adaptations in their laws and regulations in order to improve education systems and inclusive practices. For the first time, the law for students with special educational needs in Turkey (1983) highlighted the necessity of inclusion. However, inclusive services was not systematically provided until the Legislative Decree-Law No. 573 (1997). The Decree-Law enabled the evaluation of educational performance for individuals with disabilities in order to be placed in the least restrictive environment. Inclusive practices are defined in the Ministry of National Education (2018), as an education to ensure that individuals with special education needs interact with other individuals of all types and levels and achieve their educational objectives at the highest level.

The concept of inclusion does not only refer to students with disabilities being in the same class with their typically developed peers. Inclusion includes components of providing educational

support services, engaging all students in the learning process actively, involving all stakeholders of the special education process, and evaluation (Odom et al., 2005; Sönmez, Alptekin, & Bıçak, 2018). The support services improve the classroom environment and potential accommodations for students with disabilities (Odom, Buysse, & Soukakou, 2011), and increase the social acceptance of these students by their peers in their classroom (Odom et al., 2006). Therefore, the earlier individuals with disabilities begin to benefit from inclusive practices, the more positive the teaching process and outcomes will be gathered (Frankel, Gold, & Ajodhia-Andrews, 2010).

Teachers are considered to be one of the most active participant of all planned changes in education, including inclusive practices (Engelbrecht, 2013). Studies conducted in special education emphasize the importance of the role of a teacher in inclusive settings (Forlin, Cedillo, Romero-Contreras, Fletcher & Hernandez, 2010). Teachers' responsibilities and expectations differ for educational adaptations and evaluations within the context of inclusive practices (Bruns & Mogharreban, 2009). Furthermore, teachers are expected to have knowledge about the characteristics of students including students with disabilities, enable interaction between students, and employ evidence-based practices (Taylor, Peterson, McMurray-Schwarz, & Guillou, 2002). That's why, the effectiveness of a teacher education program has an influence on successful implementation of inclusive practices (Sokal & Sharma, 2018).

Teacher education programs play a key role in promoting teacher candidates' willingness for inclusive practices as well as providing information sources (e.g., such as books, seminars, and webinars) to them (Forlin & Hopewell, 2006). Thus, teacher education programs should prepare all teacher candidates for the use of various strategies that can meet the individual needs of students with disabilities (Florian & Spratt, 2013). The training that teacher candidates receive during this preparation is considered to be one of the most important factors for determining the perspectives of teacher candidates regarding to special education and students with disabilities in their prospective classes and affecting teacher candidates' success in the inclusive practices process (Mastropieri & Scruggs, 2017). Researchers have stated that teachers who graduate from teacher education programs with a negative perspective towards individuals with disabilities and about inclusive practices may disrupt their practices in their prospective schools (Forlin, Loreman, Sharma, & Earle, 2009) and it is unlikely that they will change their existing perspectives (Sharma, Forlin, Deppeler, & Yang, 2013).

Teachers can contribute to the success of inclusive practices with effective implementation or they can impede students' learning due to their lack of knowledge (Fuchs, 2009, 2010). Therefore, teacher candidates should be highly encouraged to interact with individuals with disabilities and take an active role in inclusive practices during their teacher education programs. Since teachers' expectations for inclusive education are related to their knowledge and experience about what to do in the classroom, inadequate knowledge appears to cause a negative attitudes towards students with disabilities and inclusion (Burke & Sutherland, 2004). Previous studies emphasize that preschool teachers do not have sufficient knowledge to teach students with disabilities (Bruns & Mogharreban, 2009; Kargın, Acarlar, & Sucuoğlu, 2006), have negative perspectives towards inclusive practices, and lack self-confidence when working with students with disabilities in preschool (Carroll, Forlin, & Jobling, 2003). On the other hand, it has been revealed that pre-service teachers who have completed a special education

course during their teacher education program have reduced their negative perspectives of low achievement expectations and problem behaviours towards working with students with disabilities (Sharma, Moore, & Sonawane, 2014). Based on these findings, one of the variables showing the perspectives of pre-service teachers towards inclusive practices is whether to take a course related to these practices.

Since having special education training has an important role in shaping teacher candidates' perspectives, many researchers have investigated the viewpoints of teacher candidates about special education before taking a Special Education course and whether the course has an impact on pre-service teachers' perspectives on inclusive practices (Hastings & Oakford, 2003). These studies conducted in many different countries indicated that completing a Special Education and/ or Inclusive Education course positively changed teacher candidates' perspectives towards students with disabilities (Alptekin & Batık, 2013; Campbell, Gilmore, & Cuskelly, 2003; Carroll, Forlin, & Jobling, 2003; Citil, Karakoc, & Kucukozyigit, 2018; Lancaster & Bain, 2007; Lambe & Bones, 2007; Stella, Forlin, & Lan; 2007; Tavil & Özyürek, 2009; Varlier & Vuran, 2006). In particular, the study conducted by Lancaster and Bain (2007) on the effectiveness of teachers in inclusive classrooms in Australia revealed that the teachers who only took a course, teachers who benefited from a mentor in addition to the course, or teachers who spent time in assisting the teacher in an inclusive classroom during teacher education program showed significant differences on their self-efficacy, regardless of the group. The previous studies also indicated that teachers need support to increase their knowledge in the field of special education regardless of their perspectives about inclusive practices (Akalın, Demir, Sucuoğlu, Bakkaloğlu, & İşcen, 2014; Kwon, Hong, & Jeon, 2017; Sönmez, Alptekin, & Bıçak, 2018).

The literature review indicated that previous studies examined the perspectives of teacher candidates, however, no study has been found that examines the effects of a Special Education Course on the teacher candidates' perspectives that includes their willingness and self-confidence about working in an inclusive classroom or that reveals whether or not their willingness and self-confidence are related to their knowledge level. Teacher candidates' acquisition of field knowledge during their teacher education is a requirement for their own development (Ball, Thames, & Phelps, 2008). In this respect, determining their knowledge levels, perspectives on inclusive practices including their willingness and self-confidence in these practices are important to take possible preventive steps at the undergrad level again a confusing sentence. At the undergrad level?. Therefore, the purpose of this research was to examine the effect of a Special Education course on pre-school teacher candidates' knowledge levels and perspectives towards inclusive practices including their willingness and self-confidence about working in an inclusive classroom. The following research questions guided the study:

1. What are the effects of a special education course on of teacher candidates' knowledge about the field?
2. What are the effects of a special education course on of teacher candidates' perspectives towards inclusion including
    a. advantages and disadvantages of inclusion?

   b. their willingness and self- confidence to become teachers in inclusive classrooms?
3. Was there a relationship between teacher candidates' level of knowledge and their willingness and self-confidence?

Methods

Frankel, Wallen and Hyun (2012) stated that 'In the one-group pretest-posttest design, a single group is measured or observed not only after being exposed to a treatment of some sort, but also before'. (p.269) Since the data of this study were collected before and after the Special Education course to determine the participants' knowledge about special education, their perspectives towards inclusion including advantages and disadvantages of inclusion, and their willingness and self-confidence to become teachers of individuals with disabilities, this study was considered to be a one group pre-test post-test design.

Participants

The study group consisted of 58 teacher candidates from a preschool (3-6 years) teacher education program in a university. The participants were enrolled one of the two sections of a special education course named "Special Education". Thirty of the participants were in the first section and 28 were in the second section. The implementation of this study was carried out for 14 weeks in the spring semester. The study was approved by the ethical board of the university.

The teacher candidates (52 females, 6 males) voluntarily participated in the study. The mean age of participants is 22.17. Twenty-two of the participants (39.3%) had a previous experience related to special education. Based on the demographics, out of these 22, 45.5% of the participants stated that they obtained their experiences from the trainings of Early Childhood courses, 31.8% of them stated that they had a family member with a disability, and 22.7% of them stated that they had gained knowledge about special education from books, elective courses, and seminars that they have previously attended.

Data Collection

Within the scope of this research, two data collection tools were used to determine the students' level of knowledge, their perspectives towards inclusion, their willingness and self-confidence: (a) Knowledge Level Evaluation Test, and (b) Participant Perspective Form. Furthermore, participants were asked to complete a Participant Demographic Form only at the pre-test and Satisfaction Questionnaire only during the post-test to reveal their views on the Special Education course. All forms were developed by the researchers and opinions were gathered from two faculty members who are experts in special education about forms' content and convenience. In addition, a pilot study was administered to 32 students who were studying in a different teacher education program. Considering the expert opinions and the results of the pilot application, no changes were required in the Participant Demographics Form and Participant Perspective Form, whereas the questions were made more concise and clear for the Knowledge Level Evaluation Test. After the tools were revised based on the experts' suggestion, the final versions of them were used as pre-test and post-test. Teacher candidates were also given a 4-digit numbers randomly to put on all their forms to match their pre-test and post-test data anonymously.

Participant Demographics Form.
The form included questions about demographic information of teacher candidates. The purpose of the form was to gather information related to participants' age, gender, and whether they have experience with special education. All participants completed the demographic form during pre-test data collection only.

Knowledge Level Evaluation Test.
This assessment tool was developed by the researchers of this study to evaluate students' knowledge level about Special Education course content. Knowledge Level Evaluation Test consists of 20 true/ false questions based on Special Education course content. The questions were created based on the Special Education course content spread over 14-weeks period. Expert opinion was taken from two lecturers who had previously taught Special Education course about both questions' coherence with the content and distribution between the subtopics of the course. Each question is considered as one point and a total of 20 points can be received in case of correctly answering all questions in the knowledge level evaluation test.

Participant Perspective Form.
The form contains two sections of questions about participants' perspectives toward inclusion. The purpose of the form was to collect participants' perspectives about advantages and disadvantages of inclusion, and participants' willingness and self- confidence to work with students with disabilities in inclusive classrooms. First section comprises of two open-ended questions asking about advantages and disadvantages of inclusion in their perspective. Second section includes two 5-point Likert-type questions (1- Not at all willing/ Not at all confident 5- Completely willing/ Completely confident) to assess participants' willingness and self-confidence to become teachers in inclusive classrooms.

Satisfaction Questionnaire.
This questionnaire has been developed in order to reveal the pre-service teachers' satisfaction status about the Special Education course, their views about the course that being taught in their own undergrad program, and their positive and negative thoughts about the course. The satisfaction survey consists of two Likert - type and three open-ended questions to determine social validity. All participants completed the satisfaction questionnaire during post-test data collection only.

The Implementation Process
The content of the Special Education course, which is the independent variable of the study, was organized by the researchers based on the scope determined by the Higher Education Institution in Turkey. Course content by week includes information about basic concepts of special education, assessment in special education, IEP, inclusion, inclusive practices, and the characteristics and education of individuals with disabilities including disability categories under Part B of Individuals with Disabilities Education Act (IDEA). The content was taught to two sections of the course during 2 hours per week. An interactive classroom environment was created by using various teaching techniques such as group discussion and brainstorming. Also, opportunities were provided to students to share their knowledge and/ or experiences about individuals with disabilities. The course content was presented with help of PowerPoint

software and was supported with visual stimuli. Additionally, the content was enriched with in-class applications such as how to evaluate and accommodate students with disabilities and write Individualized Education Program (IEP) goals through examples of hypothetical students with disabilities. Finally, during the lesson each week, students watched approximately 9-minute TED talk related to the subject of the week and had discussion about it in the classroom in relation to what was taught in the lesson.

Data Analysis

Data analysis was conducted by administering paired sample t-test and Analysis of Variance (ANOVA). The pre-test and post-test scores obtained from willingness and self-confidence section of the Perspectives Form were analysed using the paired sample t-test to examine the participants' willingness and self-confidence to work as a teacher in the inclusive classroom. Furthermore, the difference between the Knowledge Level Evaluation pre-test and post-test results was examined by using the t-test. In addition, ANOVA analysis was used to reveal whether the demographic characteristics, including age, gender, and experience of the participants, have any possible effect on the difference between pre-test and post-test results (Alpha = .05). Finally, the Pearson correlation coefficient was calculated to investigate whether there was a significant relationship between the level of knowledge of the participants and their willingness and self-confidence. All statistical analyses were conducted by using SPSS software package. Data collected through the Participant Demographics Form and through the Satisfaction Questionnaire were analysed and presented in the results section.

Results

The purpose of this study was to examine the effects of the “Special Education” course, which was taught 2 hours a week for 14 weeks, on the special education knowledge level of the preschool teacher candidates, their willingness, and self-confidence towards being a part of inclusive practices. The data were obtained by using the Participant Perspective Form and the Knowledge Level Evaluation Test.

Knowledge Level Evaluation

The paired sample t-test was used to measure participants’ knowledge about the special education field by examining the differences between the pre-test and the post-test results. It was examined whether enrolling a special education course increases the participants’ level of knowledge based on the Knowledge Level Evaluation Test. As shown in the Table 1, the post-test results (*M*= 17.29, *SD*= 1.90) were significantly higher than the pre-test results (*M*= 12.12, *SD*= 2.01), p<.001.

Table 1
Results of Paired Samples T-Test

Paired Differences							
			95% CI				
Mean	SD	SEM	Lower	Upper	t	df	Sig.(2-tailed)

5.17241	2.1121	.27733	4.6171	5.7278	18.651	57	.000

Note. SEM= Standard Error Mean. CI= Confidence Interval of the Difference

The effect of demographic characteristics including the age, gender, and experience on the level of knowledge of the participants was tested by conducting ANOVA analysis (Alpha = .05). The results indicated that age, gender, and the experience of the participants had no statistically significant effect on participants' knowledge level as $p = .247$, $p = .835$, and $p = .169$, respectively.

Participant Perspective Form

Within the first section of this form, the participants were asked to provide their perspective about the advantages and disadvantages of inclusive practices for students with disabilities to participate in educational activities in general education classrooms. For the pre-test, teacher candidates stated that the biggest advantage of inclusive practices as preparing students with disabilities for society, real life, and work (37.94%), while the biggest advantage found to be inclusive practices' contribution to the self-development of the teacher and other students (29.31%) for the post-test. The responses given by the teacher candidates for the advantages are shown in Table 2.

Table 2

Advantages of inclusive practices from teacher candidates' perspectives

Pre-test	f
Preparing for society, real life, and work	22 (37.94%)
Contributing to teachers and other students' self-development	18 (31.03%)
Developing awareness and positive attitude throughout the society	17 (29.31%)
There is no advantage	1 (1.72%)
Post-test	
Contributing to the self-development of the teacher and other students	17 (29.31%)
Developing awareness and positive attitude throughout the society	17 (29.31%)
Prepares for society, real life, and work	14 (24.14%)
Contributes to the students' self-development and independence	10 (17.24%)

For the pre-test, teacher candidates underlined that the biggest disadvantage of inclusive practices as potential accommodation problems in the classroom. Unlike, in the post-test, pre-school teacher candidates declared that there is no disadvantage for inclusive practices. The responses given by the teacher candidates for the disadvantages are shown in Table 3.

Table 3

Disadvantages of inclusive practices from teacher candidates' perspectives

Pre-test	f
Accommodation problems in the classroom	24 (41.39%)
Teachers' lack of knowledge and experience	18 (31.03%)
Extra time and effort that teachers need to spend	14 (24.14%)

There is no disadvantage	2 (3.44%)
Post-test	
	23 (39.66%)
There is no disadvantage	
Situations that may create interruptions in learning environment	20 (34.48%)
Inadequate knowledge of teachers	10 (17.24%)
Extra time and effort required	5 (8.62%)

Within the second section of this form, the participants were asked to provide their perspective about their willingness and self-confidence about being a teacher of students with disabilities. For pre-test and post-test results, the responses that participants gave to the two Likert-type questions to evaluate their willingness and self-confidence are shown in Table 4.

Table 4
Participants' evaluation of their willingness and self-confidence

	Willingness		Self-Confidence	
	Pre-test	Post-test	Pre-test	Post-test
1	6 (10.35%)	2 (3.45%)	11 (18.96%)	4 (6.9%)
2	7 (12.07%)	2 (3.45%)	6 (10.35%)	3 (5.18%)
3	12 (20.68%)	5 (8.62%)	25 (43.1%)	9 (15.52%)
4	19 (32.76%)	24 (41.38%)	9 (15.52%)	30 (51.72%)
5	14 (24.14%)	25 (43.1%)	7 (12.07%)	12 (20.68%)

Note. 1- Not at all; 2- Slightly; 3- Moderately; 4- Very; 5- Completely

Based on the data analysis results, the responses of teacher candidates regarding to be a teacher of an individual with a disability before and after enrolling the Special Education course were examined. The post-test results (M = 4.17, SD = .97) for the participants' willingness were found to be significantly different than the pre-test results (M = 3.48, SD = 1.27), p <.001. (Table 5).

Table 5
Results of Paired Samples T-Test

Paired Differences							
			95% CI				
Mean	SD	SEM	Lower	Upper	t	df	Sig.(2-tailed)
.6896	1.2169	.15979	.36968	1.0096	4.316	57	.000

Note. SEM= Standard Error Mean. CI= Confidence Interval of the Difference

The effect of demographic characteristics, including the age, gender, and experience of the participants, on the participants' willingness, was tested by ANOVA analysis (Alpha = .05).

Participants age F (2, 55) = 1.933, p = .154 or gender F (1, 56) =. 092, p = .763 have no statistically significant effect on their willingness. However, it was found that the experiences of the participants had a statistically significant effect on the participants' willingness as F (1, 56) = 4.409, p = .040. Participants' experiences were coded under two categories as 'Yes' and ' No'. It was found that the willingness of the participants who indicated their experience as 'No' (M = .944, SD = 1.31) were higher than the willingness of the participants who indicated their experience as 'Yes' (M = .273, SD = .94).

The participants' post-test results (M = 3.74, SD = 1.06) regarding their self-confidence were significantly higher than the pre-test results (M = 2.91, SD = 1.23), p <.001 (Table 6).

Table 6
Results of Paired Samples T-Test

Paired Differences							
			95% CI				
Mean	SD	SEM	Lower	Upper	t	df	Sig.(2-tailed)
.8276	1.4034	.18429	.45856	1.1966	4.491	57	.000

Note. SEM= Standard Error Mean. CI= Confidence Interval of the Difference

The effect of demographic characteristics, including the age, gender, and experience of the participants, on the self-confidence of the participants was tested by ANOVA analysis (Alpha = .05). The age of the participants F (2, 55) = .455, p = .637, gender F (1, 56) = 3.593, p = .063, and their experiences F (1, 56) = .023, p = .880 have no statistically significant effect on participants' self-confidence.

Relationship between Knowledge Level and Willingness/ Self-Confidence

Pearson's correlation coefficients were calculated to determine whether there was a relationship between the participants' willingness for inclusive practices and their knowledge level evaluation test result. Furthermore, the relationship between participants' self-confidence and the knowledge level evaluation test results was examined by Pearson's correlation coefficients. Before performing these calculations, the Shapiro-Wilk test was conducted and the results showed that the data was normally distributed (p> .05). According to the results of Pearson's correlation coefficients, a statistically positive and meaningful relationship had found between the level of knowledge of the participants and their willingness and self-confidence (Table 7).

Table 7
Pearson Correlation Coefficients

		Knowledge Level	Willingness	Self-Confidence
Knowledge Level	Pearson Correlation	1	.451*	.336*
	Sig. (2-tailed)		.001	.001
	N	58	58	58

* Correlation is statistically significant at the .05 level (2-tailed).

Satisfaction Questionnaire

The satisfaction survey consists of two Likert-type and three open-ended questions. For the Likert- type question of "The content of the course has met my expectations and needs", 91.37% of the participants responded as "Strongly Agree" or "Agree" while 8.63% of them stated as "Not Sure". Also, %98.27 the participants responded as "Strongly Agree" or "Agree" for the question asking "The course content has increased my knowledge and experience on the subject" while 1.73% of them responded as "Not Sure".

Open-ended questions consist of three questions asking participants whether (1) they are satisfied with the Special Education course in general, (2) they are dissatisfied, and (3) they want something to be changed / improved. Six participants did not provide their responses for the open-ended questions. Thirty-six participants (62.07%) indicated their awareness toward individuals with disabilities have improved and their opinions about what can be done as teachers of individuals with disabilities have developed with the in-class applications and videos watched during the course. Moreover, 16 participants (27.58%) showed that they were satisfied with the course as their knowledge was updated and perspectives on individuals with disabilities has improved. Thirty-two participants (55.17%) answered the question asking, what are the dissatisfied aspects of the Special Education course as "No Dissatisfaction". Other responses varied in general with regard to the course and its process including "showing more video examples (18.97%)","increasing the course credit (12.08%)", "the necessity of having the course in previous years (6.9%)", "The necessity of practicum (3.44%)", and "showing less video examples (3.44%)".

Discussion

Research indicated that inclusive practices have numerous benefits to students with and without disabilities (Ainscow, 2015; Forbes, 2007; Morińa, 2016). While the benefits of inclusion are empirically supported, teachers' acceptance of implementation of inclusive practices is controversial. Studies showed that one of the crucial elements of effective implementation of inclusive practices depends on the teachers' perspectives toward inclusion (Burke & Sutherland, 2004). Many research studies examined influencing factors such as teachers' knowledge (Mills, 2011), experience (Norwich, 2002), and educational background (Forlin, Sharma, & Loreman, 2014) that affect teachers' and/or teacher candidates' acceptance of inclusion. Also, the importance of teacher preparation programs regarding to effective implementation of inclusive practices was highlighted (Allday, Neilsen-Gatti, & Hudson, 2013). Therefore, the purpose of this study was to investigate the effect of a Special Education course on pre-school teacher candidates in terms of their knowledge levels, perspectives towards inclusive practices, and their willingness and self-confidence about working in an inclusive environment.

The present investigation showed that taking this special education course increases the participants' level of knowledge based on the Knowledge Level Evaluation Test. Based on this result, it is evident that the Special Education course was effective for teacher candidates and this result might have occurred due to using various learning strategies (Fink, 2003), implementing in-class applications of content knowledge, and watching videos related to the course content during the term. Additionally, the participants stated that in-class applications of

the course content were helpful for them to effectively use the practices for students with disabilities in the classroom. Based on the teacher candidates' responses on open-ended questions, their perspectives toward individuals with disabilities have improved owing to watching videos related to disability issues during the course. Therefore, it could be said that including various ways such as incorporating a variety of learning strategies (Weinstein, Husman, Dierking, 2005), administering in-class applications (Bain, Lancaster, Zundans, & Parkes, 2009), and using videos as a class material (Dymond & Bentz, 2006) might have contributed to increase the teacher candidates' knowledge related to individuals with disabilities.

Furthermore, the results of this study indicated that participating in the Special Education course increased the teacher candidates' awareness and improved their perspectives about people with disabilities regarding their inclusion in general education classrooms. However, when it comes to situations that create disruption in the class, teacher candidates might not have positive opinions about inclusive practices. Previous research has supported these results and suggested that teachers are more resistant to include students with behaviour problems and social emotional difficulties than to involve students who require minimal adjustments and accommodations (Brock & Beaman- Diglia, 2018; Garwood & Ampuja, 2019). Teacher candidates might carry preconceptions about having limited resources and inadequate support for their prospective classrooms. These reasons might be the causes of being resistant to teach students with disabilities in general education classrooms. Sharma, Moore, and Sonawane (2014) pointed out that teacher candidates who had an assumption of receiving poor support and insufficient resources from the school administrators were less likely to teach students with disabilities in inclusive classrooms. Another reason might be associated to having inadequate training during their undergraduate education in terms of implementing effective classroom management strategies for students with disabilities who need notable adjustments and modifications. Previous research findings also stated that additional training and use of effective strategies are necessary to experience successful inclusion (Rheams & Bain, 2005), as teachers feel insufficient to teach students with disabilities (Leyser & Kirk, 2004).

Another significant finding was that teacher candidates' willingness and self-confidence improved from pre-test to post-test. Since students were exposed to different types of instructional strategies, this finding was expected. This result has been supported by various research studies from the literature. Sharma, Forlin and Loreman (2007) stated that enrolling a course related to special education improves teacher candidates' attitudes toward inclusion as it is evident with our finding which shows a positive relationship between knowledge and willingness and self-confidence. Furthermore, exposure to individuals with disabilities during pre-service education contributed to teacher candidates' development in terms of increasing their awareness of people with disabilities and attitudes toward people with disabilities (Bradshaw & Mundia, 2006). Sharma, Moorem and Sonawane (2014) also indicated that teacher candidates' attitudes change positively when they have training related to disability issues. However, an interesting finding of the present study showed that participants with no previous experience with individuals with disabilities were more willing to work in an inclusive environment than those with experience. An explanation of this result might be related to unsatisfactory experiences that the participants previously had in real life situations. Literature suggested that teacher candidates who were confident about their abilities to teach individuals

with disabilities were the ones who had more concern in terms of implementing educational practices in inclusive classrooms (Sharma, Moore, & Sonawane, 2014). Also, they are less willing to involve students with disabilities in their classrooms. On the other hand, having an experience with individuals with disabilities had positive impact on teacher candidates' attitudes; thus, their concerns on teaching in inclusive classrooms reduced (Loreman, Forlin, & Sharma, 2007). More research should be conducted on this issue.

In addition to the effects of the Special Education course on the teacher candidates' willingness and self-confidence, the results indicated that the teacher candidates' were satisfied with the course. Based on the Satisfaction Questionnaire, the teacher candidates stated that the course were met their expectations and improved their opinions toward inclusive practices. However, there were some aspects that teacher candidates were not satisfied such as the video examples and course credit. While a few of the participants preferred to watch less videos, the majority of them stated that more videos were necessary and course credit needs to be increased. A possible explanation of this finding might be related to the need for comprehensive knowledge of the special needs of individuals with disabilities and finding effective practices based on their attributions. As literature suggested, teacher candidates found videos useful to gain relevant examples for teaching individuals with disabilities (Volker, Gehler, Howlett, and Twetten, 1986). Additionally, research indicated that the average coursework for inclusive practices was inadequate as it was less than 7 credit hours for bachelor's degree (Allday, Neilsen-Gatti, & Hudson, 2013). These results showed that teacher preparation programs need to yield more coursework related to inclusive practices to be successfully prepared for today's diverse learning needs. I do not think this conclusion can be made from this study.

Limitations and Future Directions

Results of this study should be interpreted within the context of at least three limitations. First, this study was designed as a single group pretest-posttest design with no control or comparison group which can be considered as a potential threat to internal validity (McMillan, 2008). Therefore, future researchers might replicate the study with a control group to draw sound conclusions. Next, since the pre-service teachers were the main data source, participants did not have opportunities to experience an inclusive classroom or to work with a student with disability. Therefore, results of the study might not be generalizable for all teacher candidates. Having a practicum opportunity in a real classroom will provide teacher candidates a better perspective related to inclusive practices. The readers of the present investigation should also note that there might be some other factors that could support teacher candidates improve their knowledge about inclusion and perspective about inclusive practices during the semester (e.g., books, seminars, other trainings) other than Special Education course. Even with the above limitations, the results of this analysis offer insight into the teacher education for inclusion and inclusive practices.

Implications for Practice

The current investigation revealed several implications for teachers and policy makers to enhance the quality of teacher education programs. First, teacher candidates who participated in and benefitted from the coursework developed their knowledge as well as willingness and self-confidence to work with students with disabilities. Their newly-developed perspectives might be generalized to their prospective working environment and help teacher candidates to create

better collaboration with colleagues such as special education teachers in school. Second, this study also implies that using various learning strategies such as in-class applications and video examples related to the course content created better learning experiences for pre-service teacher candidates and improved their viewpoints about ensuring all students' success in inclusive classrooms. Implications for policy makers include improving the quality of teacher preparation programs through involving more credits related to special education and/or inclusive practices to meet the needs of all teacher candidates. The current structure of teacher education programs does not involve any type of practicum opportunities for teacher candidates in Turkey. Either by involving new practical courses or reorganizing the current practicum applications, teacher candidates must be provided real life experiences. On the other hand, environmental arrangements, poor support services, and insufficient resources for inclusive classrooms should be improved throughout the country.

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Strategies and Challenges to Teaching Students with Special Needs During a Pandemic

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Abstract

The COVID-19 pandemic has led to immediate school closures resulting in online learning. Online learning under such circumstances has presented challenges for teachers of students with mild to extensive support needs. The current study interviewed twenty special education teachers about the strategies they used when teaching online and the challenges they faced. Teachers discussed several strategies including the use of direct instruction, providing active engagement, caregiver involvement, and their frequent use of informal assessments. Challenges included time constraints and student inattention. Findings of this study can be used to inform strategies to use when teaching students with special needs online and in future online emergency teaching environments.

Keywords: online teaching, virtual learning, distance learning, special education, disabilities, instruction

Strategies and Challenges to Teaching Students with Special Needs During a Pandemic

In Spring 2020, the COVID-19 pandemic resulted in immediate school closures followed by the decision to conduct K-12 instruction online for California public school teachers. As school districts continue to provide educational services to students through virtual learning environments, they must also provide equitable access to students with disabilities (Individuals with Disabilities Education Act (IDEA), 2004). This law requires students with disabilities equal access to the same education as the general population utilizing modifications and accommodations as necessary given the Individualized Education Plan (IEP) (IDEA, 2004). However, in efforts to strive for equal access to these educational opportunities and to remain compliant to students' IEPs during times of a pandemic, teachers have experienced difficulties delivering services to this vulnerable population. While students without disabilities may be able to adjust to virtual learning environments more easily, forethought might be required for students with mild to extensive support needs. Along with this notion looms the pressure that teachers feel to prevent students with disabilities already behind in their education from becoming further behind their peers, thus increasing the educational gap.

As the pandemic has continued, research has increased that explores aspects of teaching students with disabilities online. These studies have primarily focused on special educators' and stakeholders' experiences navigating distance learning during the onset of the pandemic (Samaila et al., 2020; Schuck & Lambert, 2020). For instance, Schuck and Lambert's work detailed the unsettling nature of emergency remote teaching for the two special educators in their case study, which led to challenges in overall academic achievement and supporting

families' socioemotional well-being. Many of these stressors could be attributed to having to adapt to a situation so unprecedented that little research existed on how to adjust to teaching online during the COVID-19 outbreak.

Research addressing online teaching instruction of students with disabilities provided the foundation for what elements to focus on when teaching students with disabilities online during the pandemic (Greer et al., 2015; Greer et al., 2019; Straub & Vasquez, 2015; Vasquez & Serianni, 2012; Vasquez & Straub, 2012). In fact, findings indicated that there were many benefits to teaching online (Rice & Dykman, 2018; Straub & Vasquez, 2015). Though, in their systematic reviews, Vasquez and Serianni (2012) and Vasquez and Straub (2012) had trouble identifying a substantial number of studies that indicated specific benefits of strategies for online K-12 instruction for students with disabilities. Moreover, it must also be noted that much of this existing research was conducted prior to the COVID-19 pandemic. Hodges and colleagues delineated two distinct differences between prior studies that justify a further investigation of strategies specifically used during the pandemic: 1) the abrupt change to the mode of delivery and 2) the involuntary choice to participate in virtual learning for all parties involved (Hodges et al., 2020).

Teaching Students with Special Needs

Published, peer-reviewed research on providing students with disabilities instruction in an online environment is sparse (Geer et al., 2019). This makes it difficult to even know what effective teaching pedagogy looks like for online settings. Practices mentioned in prior studies stress that teachers should adopt quality instruction that provides vocabulary and language development, engagement and social development, IEP and curriculum instruction, and on-going monitoring of progress (Crouse et al., 2018). While most special education teachers are familiar with providing instruction targeting these areas in a physical classroom setting, they report having limited to no pre-job training on how to adapt to online instruction; thus, making it difficult for teachers to transition to online instruction to support the extensive needs of their students (Crouse et al., 2018).

Vocabulary and Language Development. Whether instruction is in a language arts domain or not, teaching requires instruction that develops students with disabilities' vocabulary and language skills (Beck et al., 2013). This notion stems from research that implies teaching vocabulary can mitigate the deficits in reading comprehension that may prevent students from understanding domain specific content (Jitendra et al., 2004). To support the development of comprehension, several strategies have been used to improve vocabulary instruction for students with disabilities. Jitendra et al. (2004) identify mnemonic, cognitive, activity, constant time delay, and direct instruction as vocabulary support strategies that can be used when engaging in computer-assisted instruction. To date, little research has explored the use of these effective vocabulary strategies in the context of virtual and online learning of students with disabilities (Rice, 2016; Rice & Deshler, 2018).

Engagement and Social Development. Finding ways to engage students in the virtual learning environment is crucial to grasping concepts online (Borup, 2016; Marteney & Bernadowski, 2016). When teachers connect engaging elements in ways that encourage student-student

interaction and communication, it not only improves students' understanding of concepts, but aids social emotional development. For instance, Borup's (2016) study found that teachers had difficulty keeping track of students' time on-task as the analytics tended to not be completely accurate.

IEP and Curriculum Instruction. Teachers provide instruction based on the needs of students as identified in their IEPs (Collins et al., 2015; Marteney & Bernadowski, 2016). Marteney and Bernadowski (2016) point to online instruction as having an advantage over face-to-face instruction when providing accommodations and adaptations to lessons because lessons with smaller group sizes and shorter online sessions make it easier to individualize instruction. Such accommodations were most useful for students with visual, auditory, and physical disabilities. However, providing adaptations and accommodations may not be enough since teachers reported their students do not employ all classroom resources available to them to fully achieve their academic goals (Marteney & Bernadowski, 2016).

Review of literature on online instruction highlights a need for research that details what strategies have worked for teachers during this current pandemic to support teachers who experience similar conditions in the future. Additional research is warranted to explore teachers' abilities to provide instruction targeting vocabulary and language development, engagement and social interaction, IEP and curriculum instruction, and progress monitoring. The current study details the strategies teachers used and challenges faced when providing equitable access to education through virtual means for students with mild to extensive support needs during the COVID-19 pandemic school closures. The aim of the research was to explore the following questions:

1. What strategies did teachers use to provide instruction to students with disabilities when teaching virtually during the pandemic?

2. What challenges did teachers face when providing instruction to students when teaching in the virtual learning environment?

Methods

Participants

To address these questions, interviews were conducted with twenty K-12 teachers of students with disabilities who taught in online teaching environments during the COVID-19 pandemic. Participants were selected using snowball sampling of teachers who reside in Central and Southern California in the United States. Table 1 details descriptive data of participating teachers. The participants reported an average of 5.6 years of experiences. Seventy-five percent of the participants have worked less than 5 years in a special education setting. Fourteen female and six male teacher participants provided instruction and special education services in either a resource or a self-contained special education classroom. Nine participants teach students with mild to moderate support needs, and eleven participants teach in a classroom for students with extensive support needs or Autism Spectrum Disorder. None of the teachers had prior experience with virtual instruction.

Table 1
Teacher Demographic Data

Pseudonym	Years Teaching	Location	Grade Level	Levels of Support	Teaching Placement
Alice	5	Central	K-2nd	Autism	SC
Bethanny	1	Central	5th -6th	Mild/Moderate	SC
Brynn	4	Southern	PreK -2nd	Mild/Moderate	SC
Charity	1	Central	1st -2nd	Mild/Moderate	SC
Cindy	1	Central	K-2nd	Autism	SC
Estelle	1	Central	3rd -5th	Autism	SC
Gina	15	Southern	3rd -5th	Extensive	SC
Joe	3	Southern	10th -11th	Mild/Moderate	SC
Jordan	4	Central	8th	Mild/Moderate	SC
Karen	3	Southern	4th-6th	Mild/Moderate	SC
London	3	Central	PreK/K	Extensive	SC
Lydia	1	Central	6th -8th	Extensive	SC
Martha	3	Central	K-3rd	Mild/Moderate	SC
Penny	24	Central	PreK-5th	Mild/Moderate	Resource
Phil	1	Central	K-5th	Mild/Moderate	Resource
Ricky	13	Central	Transition**	Extensive	SC
Sally	18	Southern	3rd -5th	Mild/Moderate	SC
Sylvia	9	Central	K-4th	Mild/Moderate	SC
Timothy	0	Central	7th- 8th	Autism	SC
Todd	2	Southern	3rd -5th	Extensive	SC

Note. Location was reported by region to maintain confidentiality. Southern= Southern California, Central= Central California, SC= Self-Contained. Years of teaching at the start of school closure reported. *Lydia taught in a resource classroom Spring 2020. **Transition= Transition to adulthood.

Ethical Considerations

Specific steps were taken to ensure this study had minimal risk to participants. All participants were informed of the nature and scope of the study through email when arranging a time for the interview. Upon the start of each interview, a consent form was reviewed by participants detailing the nature of the study, that their participation was voluntary, potential risks to participation, the storage and protection of data and participant information, and how data would be used after their participation. Participants read the consent form and asked clarifying questions as needed before agreeing to participate in the study. All participants granted permission to video and audio record their virtual interviews. Additionally, names of participants were replaced with pseudonyms after transcription of data. In preparing to analyze data, pseudonyms were used, and only two researchers had access to the original recordings, consent forms, and transcription data. Due to the need to protect participants' privacy, these data would only be available to the two researchers involved in the preparation and analysis of data. This study was approved by California State University of Bakersfield Human Subjects Internal Review Board as exempt from full review as it presented a minimal risk to participants and did not include a vulnerable population or sensitive topic.

Data Collection and Analysis

Adapted from Crouse et al. (2018), interview questions were used originating from their interview protocol as the responses might be unique given the sudden and unpredictable circumstances of the current COVID-19 pandemic. Additional questions were added to garner further insights. Much like the interview approach of Rice and Carter (2015), these interviews served to construct knowledge and understanding through engaging in dialogue around interviewer questions. A mixed inductive and deductive thematic analysis approach was followed using semi-structured interviews with specific areas of teaching students with disabilities (Xu & Zammit, 2020). Interview protocol addressed strategies and challenges in the following areas: vocabulary and language development, instructional delivery, social interaction and engagement, and progress monitoring and assessment. Interview questions were organized by topic and are displayed in Table 2. Each interview ranged from 25 minutes to 1 hour.

Table 2
Sample of Interview Questions

Topic	Questions
Vocabulary and Language Development	How often in a week did you provide instruction targeting vocabulary and language development? What strategies did you use? What, if any, challenges did you have providing vocabulary instruction and language development?
Engagement/ Social Interaction	What methods did you use to engage your students in course content online? How did you maintain a professional connection or presence with your students through an online environment? What, if any, challenges did you have to engaging students and providing opportunities for social interaction?
IEP/ Curriculum Instruction	What do you use to help you make instructional decisions? What kinds of educational accommodations or modifications have you made for students with disabilities in an online course? How have you involved parents and other family members in the online learning curriculum? What, if any, challenges did you experience meeting IEP goals and/or state standards?
Progress Monitoring	What, if any, informal assessments did you use when teaching online and how often did you use them?

What, if any, formal assessments did you use when teaching online and how often did you use them?

What, if any, challenges did you have with assessing your students' academic abilities?

Interview transcripts were analyzed using principles of Braun and Clarke's (2006) thematic analysis guidelines that focus on the following: 1) becoming familiar with the data, 2) generating initial codes, 3) collating codes into possible themes, 4) reviewing themes and their utility, 5) Naming and defining themes, and 6) selecting vivid examples related to the research questions. To become familiar with the data, one researcher engaged in the full thematic analysis process. This researcher read the interview transcripts and took notes of common responses of strategies and challenges, which aided in generating initial codes for each topic queried in Table 2. Initial codes were categorized into themes. Data were then read again to assess whether the codes accurately represented the data and to ensure themes reflected the questions of interest.

Results

Each instructional topic listed in Table 2 had themes that emerged within it. Themes are presented in the results by topic as either a strategy or challenge to teaching students with mild to extensive support needs online (See also Table 3). Quotes are provided as support of each strategy and challenge identified (Brantlinger et al., 2005; Braun & Clark, 2006; Xu & Zammit, 2020). Names for quotes are provided either in-text or in parentheses immediately following a participant's quote.

Table 3
Teaching Strategies and Challenges Thematic Analysis

Topics		Theme	Codes
Vocabulary/Language Development	Teaching Strategies	Delivering direct and systematic instruction	Explicit Introduce/frontload essential words Morphemic/phonemic awareness
		Providing multiple exposures to words	Continuous review Isolated & contextual word analysis
	Challenges	Time constraints	Duration of instruction Instructional days per week
			Physical distance

		Instructional Proximity	Difficulty hearing words Difficulty pronouncing words Students unfocused Students not actively participating
		Keeping student attention	
Engagement/Social Interaction	Strategies	Using positive reinforcement	Token economy Verbal praise
		Increasing caregiver involvement	Home-to-school communication Caregiver resources
		Fostering intrinsic motivation	Survey student interests Incorporate student interests
	Challenges	Opportunities for social interaction	Student to student interactions
		Caregiver support	Caregiver hardships Caregiver time allocation Emotional needs
IEP/Curriculum Instruction	Strategies	Breaking down instruction	Cover less within a time block Focus on mastery Step by step instruction
		Providing Universal Design for Learning	Embedded accommodations More time to complete task Multiple presentations Active engagement
	Challenges	Meeting non-ELA and Math goals	Difficulty teaching writing Difficulty with gross/fine motor
		Meeting social & functional goals	Lack of community visits

			Creating real-world situations
Progress Monitoring	Strategies	Providing ongoing interactive assessments	Frequent informal assessments Less paper pencil tasks More use of technology to assess
	Challenges	Administering formal assessments	Lack of resources to implement formal assessments Too much family support
		Inaccurate assessment results	Hard time assessing through a screen

Building Vocabulary and Language Development Strategies. When interviewed, participants frequently discussed strategies for building language and vocabulary development more than any other topic queried. Recognizing a need to teach word-level comprehension, almost all participants described a process by which they selected individual words crucial to understanding the lesson, introduced the word using direct instruction, and studied the words in context. Additional strategies utilized to meet language demands online and practice vocabulary were using Boom Cards (i.e., online flashcards; https://wow.boomlearning.com) to practice words and definitions, pairing visual supports with newly introduced concepts, frontloading, and explicit instruction to meet demands within content area. Strategies fell under two themes: providing direct and systematic instruction and providing students with multiple exposures to new words. Joe who teaches 11th grade World History to students reading at 4th grade level, explained "They have to define the word and then the next part is they have to identify the picture that will fit to the word. Lastly, they will write a sentence about the word that we just have defined, and I'm using the Google Docs platform for this particular activity…basically, I use guided instruction."

To increase students' academic vocabulary, participants reported having to be more direct in the virtual setting and provided simple instructions to students. They kept vocabulary instruction short but provided it frequently. Frequency varied by participant, ranging from daily to at least twice a week and depended on the number of instructional sessions each week. The participants reported providing instruction at each instructional opportunity. Participants also embedded phonemic and morphological awareness into their vocabulary instruction to promote language development because they had many students with speech and word reading deficits. Regardless of the technology tool used, participants provided repetition with multiple exposures to words taught. This is evident in Jordan's statement, "I would use repetition a lot, seeing words in text, and reviewing those words, letting students research words." Jordan's statement gives insight into the process by which participants provided virtual vocabulary instruction that gave students opportunities to practice using words they learned. Due to many

of these participants having students with more extensive support needs, they found utility in focusing on a set of essential individual vocabulary words to build language.

Challenges. A commonality held by most participants was difficulty developing academic and functional language given time-constraints. In fact, issues with time-constraints, instructional proximity, and difficulty getting students' attention were themes across participant responses. The duration of a single block of synchronous instructional time was as little as 15 minutes in Charity's case, while Gina described the duration of time as simply not enough time to cover everything**,** particularly as she stated, "When you're teaching moderate to severe kids, you need a lot of time because just teaching one vocabulary word, it could last for an hour because you have to you have to teach them using all modalities".

In addition to the duration of time was the number of sessions per week that students received synchronous instruction. Whether duration or number of instructional sessions was the issue, the consensus was a lack of weekly instructional time with their students, making teaching of vocabulary in-context at the sentence level, as well as the passage level language comprehension, difficult to achieve. Participants expressed time to be confounded by the fact that students lacked focus during instructional time. This made it hard to improve language and vocabulary development because an inattentive student is less likely to hear, see and say the words and phrases taught. Furthermore, proximity was another barrier to language development specifically for participants who had several students with moderate to severe disabilities. These participants discussed not being next to or in front of the student as limiting the students' abilities to properly hear the pronunciation of words.

> *You know, their speech is always unintelligible, you add that with the audio quality coming through Zoom, it was very difficult. I have this one girl in my class and she's really bright, but when she talks, she has a difficult time pronouncing words and things like that. And over the Zoom class, early on in the class, I was having such a hard time hearing her that I couldn't understand her answers to questions and things like that. And I think that you know part of their vocabulary development is getting them to speak and verbalize and with my group of kids also socialize with each other and use appropriate words and things like that so that was a real challenge early on with the technical issue.* (Timothy)

Thus, participants were able to provide vocabulary instruction using best practices during virtual learning. During synchronous instruction, participants relied on more semantic practices. However, this was not the case for asynchronous delivery. Some schools lacked the knowledge and resources to teach online during the onset of school closures which resulted in asynchronous learning. It consisted of weekly work packets containing practice for vocabulary words. In both synchronous and asynchronous formats, participants focused more on covering essential word in isolation more than within the context of a paragraph or text passage.

Promoting Engagement and Social Interaction

Strategies. Participants' strategies were organized into three themes: providing positive reinforcement, actively fostering caregiver involvement, and intrinsically motivating students by including topics of interest in lessons. To keep students engaged most teachers mentioned

using a token economy or reward system to motivate and increase engagement. Gina, Charity, and Bethanny stated they set aside time at the end of each day, session, or at the end of the week to have "Fun Friday." For these teachers, "Fun Friday" was an earned privileged time where students were given preferred options of activities and could select their own activity or game. Students earned points throughout the week for demonstrating on-task behavior and participation. Yet, Alice, Lydia, and Timothy stated using topics of interest to increase engagement.

> *I'll try to tie in their interest into the instruction as much as possible, sometimes it's difficult sometimes it's easier like I have one girl in my class, and she likes my little pony. And so, when I do math lessons, I found a slide to put in my virtual background, where one of the ponies Twilight Sparkle is doing math on a chalkboard. And believe it or not a little thing like that keeps her interested, she's like, "Oh, he's got my little pony behind him so I'm going to pay attention to math*." (Timothy)

Increasing caregiver involvement was also a key element to their instructional practice. Participants reached out to caregivers of their students to support academic instruction. They also reported being a resource and emotional support system to caregivers. Participants considered this the most crucial aspect to their online teaching success because they often relied on caregivers to be instructional support for students.

> *I would give them visuals I downloaded and, and, and emailed and sent and printed and did so much for the parents to kind of set up their areas at home, you know to how we had it here in the classroom*. (London)

> *And I focus on the goals that I can work with them on in Zoom, or I can also, or we come to an agreement with a parent and see what they can work on with the student at home*. (Estelle)

In sum, participants used strategies to improve either intrinsic or extrinsic motivation to engage students in coursework and complete tasks. Intrinsically motivating factors drew upon students' interests to foster engagement. Extrinsic factors implemented tangible rewards to encourage engagement. Most participants shared the need to use more extrinsically motivated factors during virtual instruction than when instruction was in person. Moreover, all educators expressed that the relationship between themselves and caregivers as being the most crucial to student engagement in a virtual setting. This relationship is one where the educator enlists both academic supports for students to work from home and emotional supports for caregivers to feel supported when working with students at home.

Challenges. Two challenges emerged as themes: lack of opportunities for social interaction and lack of caregiver support. Participants did not have as many opportunities to create experiences for students to interact socially with one another. Most set aside time either at the beginning of the day or the beginning of the week to talk with their students and share their thoughts, feeling, or what was on their mind**s**. Undoubtedly helpful to students, these limited opportunities could not rival their in-person social interactions. While participants saw the vital role that caregivers played, not all caregivers were able to support their children due to the overwhelming nature of

the pandemic. Caregivers' struggle to make ends meet, take care of multiple children at home, have concerns over families' health issues, and experienced social and emotional difficulties themselves during this pandemic. Thus, participants expressed their challenges to engaging students who had no to minimal participation in synchronous learning.

> *And when I called home because I made phone calls home because we had to. That was part of their what we now call a distance learning plan… and I had so many parents that were so emotional over losing their jobs and I would constantly hear, "Look, I'm just trying to make sure my children are fed. So, there is a need in my household, and it doesn't involve school at this moment." And I'm like, you know, what do you say to that? I was really at a crossroads with this because I wanted to drive home the fact that their child is in special education*. (Charity)

Although participants could clearly articulate strategies used to encourage student engagement, they had a hard difficulty describing practices they used to encourage social interactions. In fact, many stated this being difficult to do in a virtual environment. This indicated a need to find practices to support social skills of students with disabilities when the instruction is virtual.

Determining IEP and Curriculum Instruction

Strategies. To meet the immediate safety needs by maintaining distance and still adhere to IEPs, Distance Learning Plans (DLPs) were instituted that made temporary agreements for what goals could and could not be addressed during the pandemic as well as what accommodations were available. When analyzing the instructional methods used by these participants, two themes arose: breaking down instruction and increasing accommodations. These participants focused primarily on reading and English Language Arts (ELA) skills most of their time teaching online.

> *So, really just more about keeping topics that were engaging for them, and then a lot of participation, so it wasn't just them sitting, staring at the screen but then talking a lot or answering questions and things like that*. (Brynn)

When instructing students, participants reported extensive use of accommodations and modifications when teaching online. Participants relied on the principles of Universal Design for Learning (UDL), a framework that increases educational opportunity and reduces barriers by providing flexibility in the way information is presented and in the way students respond to and engage with educational content (Basham et al., 2020). While adhering to UDL, participants provided an increased level of guided instruction. The participants gave students multiple ways to respond to concepts taught and demonstrate understanding, including speaking, typing, speech to text devices, and writing on paper. A specific accommodation made was to have text read to students when the purpose of the task was not reading-related. One teacher explained his thinking surrounding the importance of engagement in reading activities.

> *I have mixed feelings about get Epic [text-to-speech reading program] …When I was a kid, there was no internet. I didn't have cable TV, you know, if you, if you were creative, or you were interested in certain things, you know, going to the library was the way that you explored that and it was like exploring a new world to be able to go to the library*

> *once a week or something and get your books and, you know, financially, it wasn't a concern you didn't need money, as long as you got your books back on time. So, Epic is like that but the problem with Epic… It's, you know, it reads to the students, which is fine. If you're getting something you know kids need to hear reading done with prosody and all that but if all the kids are doing is having books read to them, they don't advance in their own reading skills*. (Phil)

Phil's response reveals his beliefs about effective virtual instruction, which were reflected in the practices he shared. For one, he believed that technology should not do the teaching, but should serve as a mechanism for which teaching takes place. For instance, his use of Epic is not to read to a student who needs practice reading. He uses Epic as to help students who need practice with language to hear language but does not use it in place of students doing the reading if they have a goal to improve their reading skills. This illustrates the need for technology used to be interactive, where students are also able to express themselves and work on concepts taught.

Challenges. Challenges with effectively meeting non-ELA and Math goals arose as a common theme hindering instructional practices. Students with disabilities often have multiple IEP goals that were a challenge for participants to address online. When describing this issue about working on writing goals, Sally explained:

> *I can't see their writing, you know they hold it up to the screen and I can't see it, you know, it's kind of hard. So, yeah, just having them in front of me, it's kind of hard to know if they're getting it or not*.

Social skills and functional goals were also challenging for participants to address virtually. London pointed to the fact that many of the issues that students have with social skills are not seen in the virtual environment because there are not as many opportunities for students to interact with each other or the teacher. She stated, "Some of those goals, the way you know they're written, it's based on a classroom environment. So, even their social emotional functional goals. It would like appear, you know, in the playground."

Many of students' communications and social interactions happen naturally, in passing, and outside of the physical classroom space (e.g., recess, lunch, passing periods, community walks). Jordan detailed his challenge with providing functional supports:

> *Some of our goals will be related to life skills transition skills. So, it's hard to do that with distance learning work. For example, a goal for a student could be using money, giving money to a clerk to buy a product, and so, obviously with this with funding we're not really able to do that. So, goals, those type of goals, it's very difficult to keep track of to do any type of progress report, because we're not out in the world, out in public, which we go a couple days a week. We'll go to Target. We go to Walmart, grocery store. We don't have that access right now*.

Again, participants mentioned student learning was restricted by time, and, therefore, they could not cover much beyond that which was explicitly stated in the IEP as a goal. Todd pointed to difficulty addressing students' IEP goals without proper resources. Illustrating his

point, Todd said, “Jumping back and forth between you know hands on manipulators and some digital resources. So, it was difficult to keep up with those IEP goals, simply because we didn’t have the resources and the materials that we had beforehand.”

In essence, when providing instruction to meet IEP goals, participants expressed confidence in their strategies to support ELA and math instruction. They also reported having little difficulty meeting reading and math IEP goals. Yet, their students with disabilities often had IEP goals beyond these two aspects of instruction. These goals, particularly for students with autism and more severe disabilities, targeted social and functional skills. Creating real world experiences and making them feel real through a screen did not seem feasible to participants. These aspects of learning were reported being by far the most challenging to support, leading to an inability to meet social skills and functional IEP goals.

Monitoring Student Progress

Progress monitoring of student performance was analyzed based on informal and formal assessments. These participants reported frequent and daily use of informal assessments. In the virtual environment, participants discussed moving away from worksheets and paper pencil type assessments to questioning and query techniques throughout lessons, polling students on a concept, and using online quiz games that generate performance reports.

> *When I was going through ratios, I was trying to figure out how can we incorporate images or something that they're aware of into ratios for my sixth graders. And so, they, they just were… the moment I presented, “Okay how many boys and girls do we have in our Zoom class?,” they were on it. They pick that up and zoom offers the features of polling, so that lets me one, check for understanding, but they also like that technical aspect of, “Oh I get to vote in and see what my friends are saying too*.” (Bethanny)

While participants frequently used informal assessments to monitor student progress, they mentioned a lack of use of formal assessments. Participants’ descriptions of formal assessments associated formal assessments with those that were standardized and provided a means to assess present levels or progress towards goals on an IEP. They expressed difficulties providing formal and summative assessments demonstrating what students know and can do on their own, since their students received much help from parents, guardians, and siblings at their home. In addition, participants either found it a challenge to assess through a screen, did not have access to the testing materials when delivering instruction from their homes, or were not allowed to give formal assessments based on school district guidelines during the pandemic.

> *My only formal assessment that I've given has been the STAR test. And, it actually went really well, except for a couple of parents that called me right after the STAR test. I had a mom that called me and said, “By the way her star score is not going to be real,” and I said, “I was actually going to call you because her STAR score was really high. Was she having a parent help her?” She goes, “Yes, she asked my husband to help her with a math problem and I told him that's not allowed that's illegal.” I'm like, “Oh Lord, so I just had to give up.”* (Charity)

During the initial phases of teaching online, participants struggled with effective use of their instructional aides. Their aides were often not allowed to be in their own online meeting rooms without teacher supervision, making it impossible to continue individualized and small group instruction while assessing individual students.

> *So, I didn't have a paraprofessional, long story short, at all this, these last two quarters. I've been working alone, which leads into the second issue, which is assessment, it's very difficult to properly assess students or assess them but all in a distance learning environment. You know, things that I can now, if I had a paraprofessional and we were doing the breakout rooms from the beginning. It would have been easier because I would be able to, you know, have the professional assist with something like guided reading while I individually assess students on you know different language arts and math skills*. (Phil)

When assessing learning, the theme that emerged was providing on-going and interactive assessments. Participants gave assessments that were informal in nature. They helped participants with giving in-the moment corrective feedback or moving forward with the lesson. Participants also used assessments to prioritize what to cover to make effective use of time within an instructional session. Unfortunately, however, participants often could not provide formal assessments that would have uncovered gaps as well as next steps for student learning. Participants expressed not being able to formally assess students as the greatest challenge.

Discussion

The current study sought to explore what instructional and assessment strategies teachers of students with disabilities used while teaching online during the pandemic and challenges to providing that instruction. It was originally thought that these strategies might differ from what teachers used during in-person instruction. However, many of the strategies that participants used were evidence-based practices used in traditional physical classroom settings (Jitendra et al, 2004). In addition, participants chose to detail practices they instituted with the technology rather than the specific tool they used to teach instructional content. This indicated that these educators understood technology was a means to access the knowledge and that the mere use of a specific technological tool was not a strategy by itself. Participants shared a need to find effective evidence-based strategies that can be accessed through the technology used.

Strategies for Virtual Instruction

In review of the strategies used, participants shared four elements that were highlighted as critical aspects of instructional strategies used by participants when teaching virtually. First, although these participants felt they increased direct and systematic vocabulary instruction in the online learning environment, these methods of instruction were consistent with what Jitendra et al.'s (2004) work identified as effective teaching methods for students with disabilities. Participants found ways to maximize their time by targeting phonological awareness and morphology during instruction while teaching vocabulary. Maximizing time in this way was viewed as an effective use of instructional time that allowed students sufficient practice with language. Second, participants in this study also suggested that caregivers play a critical role to provide successful instruction to students with disabilities in the online teaching

environment. It is suggested that educators develop plans for caregivers to engage in using meaningful opportunities and strive to communicate with caregivers in flexible and creative ways.

A third critical element of instruction was to promote multiple strategies for students' engagement in online lessons. In other words, it was not just the mere use of one specific form of technology over another that participants found effective, but the idea that it should be one that allows for active engagement and participation at multiple points throughout the lesson. This allowed participants to better check for student understanding and assess student learning as well. Fourth, these participants play an important role as a resource and instructional support. Their perspectives were that caregiver involvement and communication were at the heart of student online learning. This also was a hidden aspect of instruction that other research found when teaching students with disabilities online (Schuck & Lambert, 2020).

Challenges to Virtual Instruction

Although participants shared strategies and tools that were working for them, they also shared challenges to providing instruction online. Participants struggled with administering accurate assessments to evaluate students' progress. Reasons for inaccuracies pertained to caregivers answering assessment questions for students, lack of resources and administrative support to administer formal assessments, and little time to administer assessments. In fact, almost all participants expressed that time constraints influenced their instructional decisions. Time constraints were magnified by student inattention and lack of focus. Participants' perceptions of students' inattention are in line with Borup's study (2016) that found students lacked engagement when learning online even during pre-pandemic times. Participants also reported no or limited social interaction, which resulted in reduced learning opportunities.

Implications

The current study gives insight to practices that can be used in virtual settings, even in emergency situations, for students with disabilities. First, teachers should start by using evidence-based practices such as explicit and direct instruction, and UDL principles. Explicit and direct instruction of key vocabulary and language for students when tasks require comprehension of text were crucial to participants and would therefore be an important foundation for ELA and language instruction regardless of the online platform that teachers use. The current study encourages teachers to be equipped with a plethora of teaching tools and strategies including High Leverage Practices (McLeskey et al., 2019) and Universal Design for Learning (UDL) principles as well as evidence-based practices, which allows them to be flexible and effective in emergency situations. Participants in the current study were able to adjust and deliver their instruction utilizing those teaching frameworks.

Using technology that can be interactive and adaptable, such as Peardeck and Nearpod, in ways that provide multiple means of engagement, representation, and expression would help to meet the needs of all students in the virtual space. Teachers could use technology that provides their students with disabilities a chance to interact with lessons presented. Interaction could mean answering a poll, matching concepts, or objects, typing into a chat box, and touching or circling a visual on a screen, all tasks that are options for active participation even for the non-verbal learner.

Second, collaboration and support for caregivers become even more critical in a virtual environment. To support this endeavor, it is recommended that local districts and educators develop plans to increase caregivers' meaningful engagement and present flexible and creative ways to communicate with them (Battistin et al., 2021; Stenhoff et al., 2020). At the same time, educators should pay attention to caregivers' needs and serve as their advocates in a challenging environment. Providing such a pathway can improve both educators' and caregivers' willingness to engage in virtual learning in the future and for emergency situations (Battistin et al., 2021). During an unforeseen situation, such as a pandemic, educators are encouraged to prioritize students' IEP goals, focus on critical skills, and develop an individualized distance learning plan for each student (Weatherly et al., 2020).

Third, the researchers propose a shift in focus of pre-service and in-service preparation programs to include instructional technology supports and alternative instructional delivery methods/strategies. In the current study, participants expressed having no experience teaching online prior to the pandemic. Therefore, teaching educators how to use a combination of technologies during pre-service and in-service induction programs would provide the necessary training teachers need in a more digital era and prevent inadequate or delayed instruction in future emergency learning situations. This would require universities and districts to focus on supporting their teachers not only with knowledge on assistive technology, but how to use technology applications such as Zoom and Google Meet to connect with students using video (Currie, 2020). In addition, supporting teachers with how to use applications with recording capabilities would help special educators to provide clear and concise step by step instructions when teaching new content, as well as directions for assignments. This would not only allow teachers to save time when explaining concepts in a virtual setting, it would also provide students with the ability to review the video at their convenience and pause and take notes when needed.

Limitations and Future Research

This research provides foundational insight into what special education teachers used to instruct their students during the COVID-19 pandemic. Future research should investigate the effects of specific online strategies mentioned to assess their effectiveness with this population. In addition, this study was conducted with special educators residing in Central and Southern California of the United States. More research in other regions is warranted to provide a broader view point of teaching strategies and challenges. It does not include participants in Northern California or other locations within the United States, which could have provided a narrower and more region-specific viewpoint of teaching strategies and challenges to them. Thus, future studies that include interviews of other regions would be beneficial. Lastly, as the pandemic ends and teachers return to in-person learning or a combination of both instructional delivery methods, online and in-person, researchers should seek to investigate what lessons were learned about virtual teaching, what strategies they kept, and what technological tools they still use in their classrooms.

Conclusions

The COVID-19 pandemic led to an increased need for virtual learning modalities when instructing students with disabilities in the K-12 setting. Investigating what teaching strategies educators found useful for teaching is imperative as emergency virtual instruction has opened opportunities for online instruction. The current study focused on instructional practices teachers implemented, and obstacles faced when implementing those practices during the pandemic. Educators discussed several strategies including the use of direct instruction, providing active engagement, caregiver involvement, and their frequent use of informal assessments. Challenges included time constraints, student inattention, and a lack of resources to support virtual instruction. While the shift in mode of delivery of teaching presented some initial challenges for these educators, they shared strategies that could be used in future emergency instances and virtual teaching.

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Experiences of Parents and Practitioners Working with Middle School Students with ASD During the COVID-19 School Shutdown

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Abstract

People with Autism Spectrum Disorders (ASD) may be especially vulnerable to the effects of the COVID-19 pandemic due to their unique characteristics. This qualitative case study used interviews with instructional staff and parents to understand the experiences of both families and practitioners during the COVID-19 pandemic, and how this can inform the use of virtual instruction for students with ASD. Through the lens of Bronfenbrenner's ecological systems theory (1979) we examined how the different layers of our world shifted due to the pandemic, and what influence this had on our students with a diagnosis of ASD. Findings revealed several themes of among the interview transcripts, five main themes were observed: COVID-19, conflict of no control versus freedom, setting, technology use and preparation, and perspective

Experiences of Parents and Practitioners Working with Middle School Students with ASD During the COVID-19 School Shutdown

The novel COVID-19 virus has had global impacts that have greatly changed people's lives. From public health issues and fear of infection to requirements to socially distance, and wearing of masks in public, to the uncertainty surrounding when or if the virus can be controlled, COVID-19 has introduced an unprecedented level of anxiety and stress into people's lives. The effects also have highlighted issues of social justice and vulnerabilities of certain groups of people, including low-income, elderly, and people with disabilities. People with Autism Spectrum Disorders (ASD) may be especially vulnerable to the effects of the pandemic due to their unique characteristics.

People with a diagnosis of ASD have challenges in communication, socialization and engage in stereotypic repetitive behaviors. These differences impact how people with ASD interact with others and the environment. To support them in school, students with a diagnosis of ASD are typically afforded physical and curriculum adaptations through an individualized education plan (IEP). The IEP mediates challenges through needed services, such as special education and related services, supports the learning environment, and measurable annual educational goals that meet the individual needs of each student. In the spring of 2020, when many schools were forced to educate students remotely due to the COVID-19 pandemic, all students received their education plans through a virtual teaching/learning model.

This study sought to understand the lived experiences of teachers and caregivers of students during this unprecedented time in educational history. Through the lens of Bronfenbrenner's

(1979) Ecological Systems Theory, we looked at how the different layers of our world shifted due to the pandemic, and what influence these shifts had on our students with a diagnosis of ASD. This qualitative case study used interviews with instructional staff and parents to understand the experiences of both families and practitioners during the COVID-19 pandemic, and how this can inform the use of virtual instruction for students with ASD.

Literature Review

Educational experiences of all students are influenced not just by the student's perceived abilities, but also by policies, practices, beliefs and research over time in society. Urie Brofenbrenner's (1979) ecological systems theory of human development captures the many layers of influences the environment has on a child's development, including their educational experience. Brofenbrenner posits five layers of society - individual, microsystem, mesosystem, exosystem, and the macrosystem - that envelop each child, therefore influencing their development (see Figure 1). These layers change and shift over time, which is noted as the chronosystem, or the linear movement of the five layers that runs from past, present and future. The literature that informs our study structured around ecological systems theory is discussed in these layers to exemplify the influence of them on students with ASD.

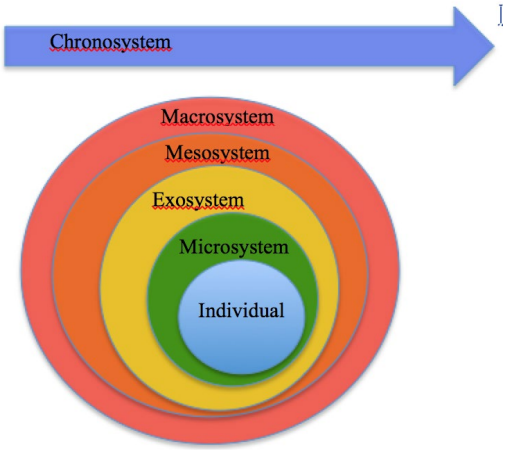

Figure 1: Ecological System Theory (Bronfenbrenner, 1979)

Individual

The "individual" at the center of this study is a student with autism spectrum disorder (ASD). According to diagnostic criteria, students with ASD are characterized as having deficits in communication and socialization while also engaging in stereotypic repetitive behaviors (American Psychiatric Association, 2013). ASD is characterized as a spectrum disorder due to variation in behaviors demonstrated by each individual diagnosed. Intellectual ability for students with ASD vary, with 31% of children classified as intellectually deficient, 25% of students in the borderline range, and 44% of students at or above the average intellectual range (Baio et al., 2018). Significant communication needs, which can be difficult to define based on the variation of definitions that surround the terms verbal, nonverbal, and minimally verbal

(Norrelgen et al., 2014), characterize 25-35% of the ASD population (Rose, Trembath, Keen, & Paynter, 2016).

The understanding of the environment, interactions in and with the environment, and the movement through these environments are all transactional experiences that affect the individual. Understanding how the characteristics of an individual with ASD has been affected by the experience of the pandemic demanding social distancing, mask wearing, and remote learning may provide an understanding of how individuals with ASD connect to their environment. For example, as indicated, people with ASD have unique social needs (APA, 2013); therefore, required social distancing may further impact the ability of people with ASD to develop or continue existing social relationships. Additionally, people with ASD often require structure and may experience difficulty with change in schedule or routine (APA, 2013). The disruption of typical routines due to the pandemic and shut down may be stressful and anxiety provoking for people with ASD (Houting, 2020). Finally, given the varied cognitive levels of people with ASD, there may be difficulty in understanding the virus, the pandemic, and the need to shut down (Houting, 2020). These experiences pulse both inward and outward through the layers of the ecological systems shaping the individual's identity, which is most closely mediated by the microsystem.

Microsystem

The microsystem is the most proximal system to the individual (Brofenbrennar, 1979). This system is the layer of interpersonal relationships that surround the individual and includes high frequency interactions of the individual with other people such as parents, caregivers, teachers, friends, and classmates. The relationships in the microsystem, which have the most direct effect on the individual, are multidirectional and rely on communication and social abilities. The triad of characteristics (communication, socialization and stereotypies) of ASD may impact relationships in this system.

The shift to online instruction during the COVID-19 pandemic limited face to face interactions with people outside of the home, reducing interactions in the microsystem. This placed a stronger demand on families to not just be caregivers but to provide instruction and support to students with ASD. Research outcomes do positively support family-mediated interventions through direct training over time, to provide communication and social interventions for students with ASD (Barry, Holloway, Gunning, 2019; Bradshaw, Koegel, & Koegel, 2017). During the spring of 2020, however, the COVID-19 pandemic pushed instruction online swiftly, without affording practitioners and caregivers proper planning, training, and time to collaborate on best practices. The time and methods for collaboration of multiple organizations found in the mesosystem may impact the delivery and effectiveness of interventions to mediate deficits in communication and socialization for students with ASD.

Mesosystem

The mesosystem is the organization layer of ecological systems theory. This layer zooms out from the individual relationships to the organizations around the individuals in the microsystem (Brofenbrenner, 1979), such as family, school, church, neighborhood, and clubs. The relationships between these organized groups (e.g., school and home, club and school) affect how the student functions within these organizations. This layer differs from the microsystem in

that it is not the direct contact of an individual to an individual, but the interactions of those organizations with the individual. The focus of this research examines the relationship of the family and the school.

The Individuals with Disabilities Education Improvement Act of 2004 (Turnbull et al., 2010) emphasized parents as shared decision makers giving them a more prominent role in the development of their child's Individualized Education Plan (IEP) through the creation of collaborative relationships. Collaborative relationships, also known as family school partnerships (Garbacz et al., 2015), differ from simple parent involvement in that they are mutual, reciprocal relationships over time to support student's achievement (Rispoli, Lee, Nathanson, & Malcom, 2019).

The shift to remote, online instruction due to the COVID-19 pandemic altered collaborative relationships and the ways in which schools and families were interacting, with parents and caregivers having a more prominent role in coordinating how students would engage in learning. Unlike in research studies, families were not properly trained in how to implement interventions and teach their children. Parents and caregivers were also dealing with variation in their abilities to engage their children in remote learning due to shifts in how organizations in society were dealing with the pandemic. These societal organizations known in the exosystem were greatly affected, which permeated into each layer of ecological systems.

Exosystem

The exosystem is distinct from the microsystem in that it is not in direct relationship with the individual, but the relationship from organization to organization (Brofenbrenner, 1979), including community policies, school funding, workplace flexibility, and the availability of community resources, which may influence an individual's experience.

Policy shifts have had a profound effect on individuals with disabilities, with the education for individuals with disabilities having undergone multiple iterations to provide equitable and meaningful educational experiences. Legislative acts (Education for All Handicapped Children Act of 1975; IDEA, 1990; IDEA, 1997; IDEIA, 2004) have ensured that individuals with disabilities are guaranteed a free and appropriate education (FAPE) in the least restrictive environment (LRE).

The COVID-19 pandemic impacted where and how community support, services, and care were provided, if at all, to families (Courtenay& Perera, 2020). The shift in services impacted individuals with disabilities by increasing anxiety, shifting delivery of clinical services, and decreasing safeguards to prevent abuse (Courtenay & Perera, 2020). The disruption to routines and support for students with disabilities may also have led to behavioral changes (Courtenay, 2020) increasing stress for the individual and families. Adding to the stresses of a disruption of services and support for individuals with disabilities is the disruption to jobs, financial support, and community support services during the COVID-19 pandemic. The macrosystem, or outermost layer, of ecological systems theory provides the larger context of society that determines how the exosystem impacts individuals with disabilities, and more specifically, students with ASD.

Macrosystem

The macrosystem is the most distal layer of Ecological Systems Theory (Brofenbrenner, 1979). This layer is the larger cultural or social context of society including beliefs, services, socioeconomic status that permeates each layer of the system influencing who, what, where, when, and why of our interactions (Brofenbrenner, 2005). The COVID-19 pandemic dramatically shifted society in the spring of 2020. The mass quarantine limited societies' ability to travel, interact with others, and severely altered how essential services such as health care, food supplies, and social service supports were delivered (Isaac et al., 2020).

In addition to the delivery of services and access to institutions being limited and/or altered, the belief system of society seemed uncertain. The shift in Center for Disease Control and Prevention (CDC) guidelines regarding the coronavirus left some with feelings of uncertainty about social distancing, and hygiene practices (Pelicano et al., 2020) The continued research and knowledge of COVID-19 led to shifts in policies and practices that could be confusing, and increase anxiety in communities and individuals (Pelicano et al., 2020).

Summary

The movement of each system (macrosystem, exosystem, mesosystem, and microsystem) through time (chronosystem) has all impacted the individual's development and may have had a distinct impact on individuals with ASD, given their unique characteristics. Investigating the lived experiences of individuals with ASD during the COVID-19 pandemic can assist in the understanding of support systems at each layer of influence to support the growth and development of individuals with ASD across all environmental settings, but especially home and school. This study provides an opportunity to understand the benefits and gaps of online instruction for students with ASD.

Methods

Research design overview

The purpose of this research study was to understand the lived experiences of families and practitioners living and teaching students with autism spectrum disorder (ASD) during the COVID-19 pandemic in the spring of 2020. This study followed a qualitative case study approach of inquiry to understand the shared experiences of practitioners and families who worked specifically with students diagnosed with ASD to understand common themes around the experience of abruptly going to virtual instruction in the home due to the pandemic. Understanding the challenges and success of these families and practitioners may provide insights on how to support students with ASD with online instruction through engaging activities and family support.

Participants

Research participants were recruited for interviews following Institutional Review Board approved protocols. Parents and practitioners were recruited simultaneously. Participants were parents of students with a diagnosis of autism spectrum disorder (n=3) and educators (n=5) who directly instructed the students diagnosed with autism spectrum disorder online during the spring of 2020.

The parents (n=3) of the students with ASD were all mothers. All families had both the mother and father present in the home during the COVID-19 shutdown in the Spring of 2020. The families had children who ranged in age from 11-13. The first parent, Ruth, had three children, while the other two, Donna and Wendy, each had one child. All parents worked outside the home, and Ruth and Wendy had the ability to work from home during the pandemic. All families worked with educators at a public middle school.

Educators (n=5) interviewed for the study were all professionals who worked in a public middle school. Participants ranged in age from 35-58 and had 10-26 years of experience working in school settings. The educators included three special education teachers, one speech and language pathologist, and one social worker. All of the educators worked directly with the families interviewed for this study. See Table 1 for information on the educators.

Table 1
Educators of Students with ASD

Educator	Years in Education	Teacher or practitioner	Children living at home
Anna	26	Special Education Teacher	1
Betsy	28	Special Education Teacher	0
Diane	10	Special Education Teacher	2
Emma	12	Speech Pathologist	2
Jen	8	Social Worker	0

Setting
This research was conducted in a suburban district middle school in the Northeast United States with an enrollment of 5,100 students and approximately 710 students with individualized education plans (IEPs). The percentage of students with IEPs (13.9%) is equivalent to the national average. All of the participants were parents of or providers to students in a self-contained life skills program at one of the district's two middle schools.

Researcher positionality
The first and second authors are doctoral level scholars of research exploring best practices in supporting students who identify as autistic. The first author is a university professor and former teacher of students with ASD who has an existing professional relationship with the second author. The second author currently teaches students with ASD in the same middle school from which participants were selected from the study; in fact , she taught the children of the parents who participated in the study. She conducted the interviews in order to create a comfortable environment in which the participants could discuss their opinions within a context that was familiar. In order to ensure the participants did not feel pressured to “say the right thing”, they all were offered the opportunity to be interviewed by the first author, who has no

affiliation with the school district. All participants chose to be interviewed by the second author.

The third author is a doctoral student who has worked with students with ASD as an educational aide in a school district near the district that was included in this study. The fourth author is a doctoral student who has experience working with students with ASD in schools in his native Iran. None of the first, third, or fourth authors have a direct relationship with any of the study participants or their school district. All researchers have an interest in advancing the rights of people with ASD, and exploring the best ways to provide them with an education.

Procedures

Parents and educators were invited to participate in this study through emails. Purposeful sampling was used to focus on the unique experiences of moving to virtual instruction for both families and educators of students with ASD during the spring of 2020. Any parent or educator in the selected middle school who expressed an interest in participating in the study was included. Once parents and educators agreed to participate in this study the informed consent information was emailed to participants to review and sign. Signatures were collected through emails, and interviews were scheduled. Invitations to complete the interviews were sent out using the Google platform (Google Calendar, G-Mail). Interviews were all one-to-one with the second author and were conducted using the Google Meets platform due to the COVID-19 pandemic and the need to social distance. The families and educators were familiar with this platform since it was adopted by the public-school district as the platform used to deliver virtual instruction. When participants logged onto their interview they were asked if they had any questions, and informed consent information was reviewed. Following this information and question session participants were asked if the recording of the procedure could begin. The interviews were 20-30 minutes in duration. Open-ended, semi-structured interview questions were asked to elicit the stories and experiences of moving to virtual instruction during the spring of 2020. Data was collected through the recording feature of the Data were collected and transcribed, then analyzed by two doctoral students who coded the data into categories and themes.

Data Analysis

Throughout the study data analysis was conducted through transcribing interviews, as well as developing inductive and deductive coding. The third and fourth authors, both of whom had experience analyzing qualitative interview data, created a table of codes for initial coding, based on an initial reading of the transcripts. The codes were then shared and discussed with all authors. After every couple of themes were coded the two coders met to discuss the coding process, identify unexpected themes, and create and clarify the wording of subcodes (Glesne, 2016). Once the final codes were developed, the coders independently coded the interview transcripts by hand (i.e., no analysis program or software). The unit of analysis was sentence.

Journals were kept for reflexivity purposes throughout this process, and were shared during periodic meetings between coders. The journals centered on the coding process, how the codes were working with the data, and if there were any clarification issues. A complete table of the codes is included in Appendix A. The definitions of the codes, along with examples from the transcripts, ensured validity among coders. Each code and subcode was discussed between

coders so that when independent coding was conducted each had the same understanding of the code and subcode's definition. Ultimately, there was the initial reading of the transcripts to draft the table of codes, one round of independent coding done by each coder, and one round of coders going through each code in each transcript together for data analysis.

Inter-rater Reliability

When coding was completed the coders met to discuss each code across all eight transcripts to determine inter-rater agreement. The first, second, and fourth codes (COVID-19, no control versus freedom, and technology use and preparation) had 100% inter-rater agreement across all codes. The third, setting, had 100% agreement on the school code, 95% agreement for home code, and 96% agreement for student engagement code. For the fifth theme perspective on the positives and challenges, there was 94% agreement for the code positives and 97% agreement for the code challenges. Any disagreements were discussed and the evidence from the transcripts were included or excluded when both coders came to a consensus.

Validity and Trustworthiness

This qualitative research takes place in the real world context of the 2020 pandemic. To ensure this research is valid and trustworthy considerations of confirmability, reliability, internal validity, external validity, and application (Miles, Huberman, & Saldana, 2014) were considered and are presented in the Validity and Trustworthiness table (Table 2)

Table 2
Validity and Trustworthiness (Miles, Huberman, & Saldana, 2014)

Consideration	Tactic	In This Study
Confirmability	Use of contrasting cases	Interviewing parents, teachers, & practitioners
	Avoiding influence	Clarify intentions
Reliability	Corroboration	Member Checks on accuracy of data.
	Intercoder agreement checks	Two coders: Inter-rater reliability conducted
Internal Validity	Rich context	Interviews
External Validity	Data Sources	Rich description of participants, setting, and process.

Application	Share research	Findings intellectually and physically accessible to users

Findings

Among the interview transcripts, five main themes were observed: COVID-19, conflict of no control versus freedom, setting, technology use and preparation, and perspective. Within each of the themes, codes and subcodes helped to further understand practitioner and parent perception of the impact of COVID-19 on students and children academically, socially, and emotionally.

COVID-19

The prevailing theme among participants, mentioned 51 times, was how COVID-19 impacted lives of students, families, and practitioners. The impact of COVID-19 on multiple stakeholders made it necessary to code each group separately, resulting in three areas: students' awareness of COVID-19, how families addressed COVID-19, and how practitioners addressed COVID-19.

Students' Awareness of COVID-19

The code of students' awareness of COVID-19 was shaped by practitioner and family perception of student awareness through anecdotes of conversations with students. Practitioners mentioned this code 12 times, and parents mentioned this code seven times. Overall, all practitioners and families said students had a basic understanding that a virus making people sick was going around, which closed schools. Beyond that basic understanding, all three parents were not quite sure just how much of the situation their child understood.

How Families Addressed COVID-19

The code of how families addressed COVID-19 involved family conversations around the subject. Parents mentioned this code 10 times. All parents discussed COVID-19 with their children, why schools had to be closed, and why they had to see their friends on the computer instead of in the classroom.

How Practitioners Addressed COVID-19

The code of how practitioners addressed COVID-19 included various presentation methods. Practitioners mentioned this code 22 times. Jen and Emma did not speak to students directly about COVID-19. Instead, they sent resources, such as educational YouTube videos or articles, about the topic to parents or worked with teachers to support the method a teacher was using to discuss the topic with students. The other three practitioners did address the topic directly with students.

Conflict of No control versus freedom

A second theme throughout the participant interviews was a conflict between feelings of no control versus feelings of freedom. This theme was mentioned 100 times across interviews. The two codes under this theme of conflict are no control and freedom. The dynamic within each of these codes made it important to divide into subcodes in order to understand this conflict.

No Control

Families and practitioners expressed the uncertainty that the pandemic brought in terms of how long virtual instruction would last, the metrics used in monitoring the pandemic, and how this affected families, community and society. Feelings of no control were mentioned 25 times. This code was divided into two subcodes: unknown length of the shutdown and waiting for guidance.

Unknown Length of Shut-Down. This subcode was mentioned 11 times by practitioners and once by parents. Anna, Diane, and Jen each described how students and families looked to them for answers about how long the school would shut-down be. However, the message to families kept changing each time the situation changed. Practitioners were used to being able to give more consistent recommendations about school procedures.

Waiting for Guidance. The second subcode under the no control code, waiting for guidance, appeared in practitioner interviews 13 times and did not appear in parent interviews. One of the practitioners felt specifically there was a lack of guidance on how to carry out instruction, and another practitioner felt there were unclear expectations for the staff. A third practitioner (Emma) felt the lack of resources and guidance was because everyone was "just trying to survive."

Freedom

Participants in this study expressed a sense of freedom as both practitioners and parents during virtual instruction, as families and practitioners could customize instruction to meet the student's needs. This code was mentioned 75 times across interviews. There was a sense of flexibility this shutdown provided participants and to explore this further the freedom code was divided into two subcodes: creating schedules, and expectations of students to engage in instruction and achieve goals.

Create own schedule. All participants discussed the need to develop a schedule to establish a routine. Practitioners mentioned this code 33 times, while parents mentioned this code eight times. Parents each described the routine established so that their child could then meet the schedule set by the teacher. Ruby's three children, for example, had a different schedule she had to manage. All parents discussed the goal to create realistic routines with public closures, and the demands of parents' work even with the understanding of employers. While each of the parents had a schedule they aimed for, there was some flexibility in the times.

Create Expectations.. The shut-down was such uncharted territory that practitioners had freedom to decide expectations but were uncertain just how much practitioners could expect students to complete tasks or attend Google Meets. Practitioners mentioned this code 34 times, while parents did not mention this code. All practitioners acknowledged the reality that expectations were going to fall on parents to keep their children on task. Students were given work at a more flexible pace. Practitioners determined different expectations of students, how often to go to a Google Meets, and whether it was more important to spend time learning how to use the technology or complete the assignment.

Setting

The theme of setting was observed among all participants through the tension of what was school and what school looked like at home. Three codes were used in this theme: school, home, and student engagement. The code of school looked at the description of schedule and the practitioner in charge. The code of home includes three subcodes and the code of student engagement included four subcodes.

School

The code of school revealed how practitioners talked about the school environment and their role in that environment. This code appeared once in every practitioner interview except for Jen's, where it appeared twice. This code also appeared once in every parent interview except for Donna's, where it appeared twice. None of the parents described the school setting other than mentioning how schools have routines and schedules, including receiving support services. Students could better understand situations (home and school) when the teacher or an adult was with them to guide the student.

Home

The influence of home on the effectiveness of remote learning was important to explore. The home code was mentioned 67 times across all interviews. The dynamics within the setting of home led to it being divided into three subcodes.

Child's Perception of Home. How the child perceived the role of home with their schooling affected how receptive the child was to remote learning. The child's perception of home was mentioned three times by practitioners and four times by parents. Six of the eight interviews described difficulty among students understanding why they were doing school at home. Both parents and practitioners mentioned how behaviors at home and school are different. Some of Diane's students did not understand when the school year ended because for them the whole shut-down felt a bit like summer. All three parents said their children were happy to be home, yet the building of a school routine while home was difficult to consistently get their children on board with.

Parent as Practitioner. During the shutdown, the parents assumed the role as practitioner because they were in the same place with the child in the home. Practitioners mentioned 17 times what it was like empowering parents to be effective practitioners. Parents mentioned 19 times what it was like to assume the role of practitioner. All three parents shared how the academic expectations were more likely to be met and the academic routine followed if the parent sat with the child. If the task was something their child enjoyed, all three parents could step back, giving more independence. All five practitioners expressed concern they were passing on their responsibilities in providing direct support to students onto the parents, who had plenty of additional responsibilities already. All five practitioners worried about overwhelming families. Four of the five practitioners discussed how parents needed to be trained in how to provide the necessary academic support and support services. Parent training would also encourage parents "to be willing to ask for help…to have those open lines of communication" (Jen Interview).

Working from Home. This subcode included practitioners and parents meeting their own work demands within the home or when they had to leave the home. Practitioners described this experience 18 times. Parents mentioned this code 6 times. All participants expressed that during this time they just tried to do the best they could balancing home with work and school. Four of the practitioners shared they struggled initially to create a balanced structure to their day. All practitioners talked about how the lines blurred between home life and school life because there were no markers for what constituted the start and finish to the day. Jen, Emma, and Anna tried running, yoga, and home gym exercises, respectively, as a way to maintain balance. All practitioners shared feelings of stress in their own lives while trying to be effective remote learning practitioners, as well as the stress they perceived among their students' families. Two of the three parents shared how they and/or their partner were able to stay home to work remotely. This allowed parents flexibility with who provided direct support to their children's remote schooling while meeting work demands. One of the parents worked the night shift in a hospital and supervised her child's remote learning in the morning. None of the parents talked about how they managed their stress, but two of the parents mentioned the importance of sleep, and that being their "downtime."

Student Engagement

Student engagement was mentioned 138 times across interviews. As a result, this code was broken into the following subcodes: interaction with peers, interaction with practitioners, interaction with environment, and disengaged. Each of these subcodes can increase and decrease student engagement.

Interaction with Peers. This subcode primarily centered around how students interacted with each other in the Google Meets. Practitioners mentioned this code 11 times and one parent mentioned it once. Four of the five practitioners described the struggle students had interacting with each other, picking up on social cues, tolerating other students' impulsivity, and taking turns speaking.

Interaction with Practitioner. Practitioners mentioned this subcode 45 times across interviews, and parents mentioned this subcode four times. Across all the practitioner interviews was the sentiment that there was not consistent interaction with their students across emails, assignments, and Google Meets. However, all practitioners had the most engagement during Google Meets, when they felt they were forming the best connections. Overall participation in Google Meets grew over time. However, there were a few students whose participation decreased as time went on. In order to ensure the greatest likelihood of participation, practitioners used strategies such as sending emails to parents, using a reminder text application, and setting a predictable schedule.

When parents discussed interaction between students and practitioners, they described how the practitioner provided activities. Practitioners might give feedback on an activity's accuracy or describe going through the motions of learning how to access the activity, complete it, and return it was more important than assignment accuracy. The primary goal was to keep contact with students.

Interaction with the Environment. Interaction with the environment is defined as what was going on in the students' homes as they learned remotely. Practitioners mentioned this subcode 13 times, and parents mentioned this code 34 times across interviews. All the parents shared that if their schedule allowed them to sit with their child, their child was more likely to be engaged. Ruth and Wendy described some behaviors they saw from their children once remote learning started, some of which were regressions. Wendy shared examples of her child eating non-food items, as well as not always communicating bathroom needs. All five practitioners shared examples of challenges in students' home environments that impacted remote learning, including background noise and dogs.

Disengaged. This subcode was observed by practitioners during remote learning activities and Google Meets. Practitioners mentioned this subcode 23 times, while parents mentioned this subcode seven times. While overall practitioners contacted more of the students and their families, there were a few cases where, in spite of repeated attempts to contact through email, texts, and Google classroom announcements, families were unreachable. Each practitioner described situations where they had very little to no contact with some students. When some students stopped participating, practitioners relied on communication with the families. Behaviors of other students, as well as impulsivity of seeing the students and their peers on screen, led to students signing out of the live meet-up or arguing with each other. Diane wished the high level of participation in Google Meets transferred into a higher level of participation in activities outside of live meet-ups. Parents each shared how when their child was without someone next to them, they were more likely to stop working. However, the nature of the task played a major role in the child completing the task. For example, Wendy's child listened to online readings, but only answered comprehension questions if someone was next to her.

Technology use and preparation

The fourth theme among the data is technology use and preparation. The reliance of technology in order to create remote learning environments made the way participants discussed the role of technology an important aspect to explore. Across interviews, this code was mentioned 76 times. Within this theme are three codes: unlimited access to technology, limited access to technology, and educator preparation. Limited access to technology had three subcodes and educator preparation had two subcodes.

Unlimited Access to Technology

The first code, unlimited access to technology, primarily centered around how participants viewed the resources available through technology. This code appeared in practitioner interviews four times and in parent interviews twice. At first, practitioners felt overwhelmed. However, there was a decrease in resources shared as time went on, as everyone focused on immediate demands of their own caseloads. Betsy expressed that if the volume of resources practitioners had to manage was more streamlined, that would then help families manage all the passwords, pin numbers, and websites. Wendy and Donna turned to Google for supplemental resources, in addition to using what the school provided, in order to increase their ability to support remote learning.

Limited Access to Technology

Limited access to technology was mentioned 10 times across interviews. The various ways access can be limited made it important to divide this code into three subcodes: free resources, access to printers, and access to the Internet.

Free Resources. The subcode free resources was coded seven times among all practitioners who turned to free resources on YouTube and Teachers Pay Teachers website. Access was limited to practitioners by websites or programs that did not sign the district's private policy agreement. If the fee of a website or program was not approved by the school district then access to those websites or programs is also blocked. None of the parents discussed any limitations to resources due to whether they were free.

Access to a Printer. Access to a printer is a practical issue that arose from a reliance on technology. This subcode was mentioned two times by practitioners and was not mentioned by parents. Two practitioners mentioned the lack of a printer negatively affecting students' ability to engage in remote learning. The rationale was that some students might be better able to complete tasks that could be completed with paper and pen rather than just through the computer. When tasks were not completed by students, Diane and Emma wondered if the lack of a printer played a role.

Access to the internet. Access to the Internet was included in that those with limited access to data or no Wi-Fi would also negatively impact student engagement. One practitioner mentioned this subcode, while no parents mentioned this subcode. Surprisingly, no participants described a scenario where lack of access to the Internet led to students unable to engage in remote learning. The only participant to mention internet data was Jen, referring to her own limited access to internet data taken away from her family to support her work responsibilities. Everyone in the household needed access to the internet, so if Jen used internet data to be able to perform her role as a practitioner in remote learning, then her children would not have as much internet data available for their own school work being done through remote learning.

Practitioner Preparation

Practitioner preparation was mentioned 51 times by practitioners and nine times by parents. Practitioners had to prepare for the initial shutdown and shift to preparing materials for remote learning and use technology to carry out instruction. Therefore this code was divided into two subcodes: instructional methods using technology, and preparation.

Instructional Methods Using Technology. During the shutdown, technology was the vehicle to carry out instruction. Practitioners mentioned how they used technology to carry out instructional methods 36 times and parents mentioned this subcode seven times. None of the practitioners used Google classroom before the shutdown. They had to learn how to use Google classrooms either with their own students or join general education teachers' Google classrooms to interact with students on their caseloads. Google classroom was the main way to interact with all the students at once and was the vehicle used to send messages, schedules, independent activities, and videos.

The more comfortable practitioners felt with using the technology the more they were able to explore different ways to use it for instruction and curriculum, and the more they wanted to continue using technology in this manner in the future. That practitioners could use Google classroom to post tutorial videos was a major appeal for practitioners. All the practitioners discussed how much they liked Google Meets for more traditional direct instruction and class discussions. They all wished they had done even more live meet-ups. Practitioners also expressed the hope that with a better understanding of technology and resources they will be able to better differentiate instruction for students. The parents shared how Google classroom was the main source their children's teachers used for instruction. Only Ruby specifically mentioned how her children participated in Google Meets. When asked what could be improved, Ruby felt her children engaged more in activities that were posted rather than the live class sessions, and so she would have liked even more YouTube videos and stories.

Preparation. In order to make sure students engaged as much as possible in remote learning, practitioners discussed how they themselves (or others) were able to get materials to students. Practitioners mentioned this code 15 times and parents mentioned this code twice. Practitioners started the shutdown by using websites students were already familiar with, such as Reading A-Z. This way the students already had any necessary pin numbers or passwords for immediate access. All participants shared how the access to the Internet was how families could get materials from educators, in particular through Google classroom. Four of the practitioners felt paper and pencil options together with online learning would have helped students. In the beginning of the shut-down students had been sent home with paper and pen activities. As the shut-down continued it was up to families to provide paper options by printing out anything posted. However, Emma also shared how one of the principals would deliver paper materials to families. This was the only example from the participants where someone hand delivered materials during the shut-down. Practitioners shared examples of students completing tasks separately on paper and taking screenshots, scanning the work to practitioners, and students holding up their work done on paper during a live class.

Perspective

The fifth and final theme is participant perception of this experience on education. This theme appeared across interviews 97 times. The two main codes in this theme are positive experiences and challenging experiences. Within each of the codes are seven subcodes.

Positive Experiences

The experience of the initial shutdown and subsequent transition to remote learning left a lasting impression on participants. Positive experiences were mentioned across interviews 41 times. The dynamics of the varied areas participants discussed made it necessary to divide the code into seven subcodes: time to learn technology and apps, teaching students how to use Google classroom, practitioners and families developing a rapport, families increasing time together, parents learning how their child learns, feeling proud of what students and practitioners were able to accomplish, and emotional support among colleagues. .

Time to Learn Technology and Apps. Each of the practitioners valued the time spent during the shut-down to learn technology. Practitioners mentioned this subcode 11 times and parents did not mention it at all. Each practitioner also described increasing confidence in their ability

to use technology effectively as time went by in the shutdown, as well as how they will use technology in the future. All of the practitioners said they would use Google classroom in the new school year, either in person or if there was ever a return to remote learning. None of the parent interviews discussed valuing time to learn technology.

Teaching Students How to use Google Classroom. Google classroom was the main way each practitioner communicated with students and provided instruction. Having the opportunity to teach students how to navigate Google classroom was considered something positive to come out of this experience. Practitioners mentioned this subcode four times, while parents did not mention this at all. The main sentiment expressed by practitioners was how students were trained to effectively participate in online instruction.

Practitioners and Families Developing a Rapport. Through emails and Google Meets, families were part of the educational experience all day, providing an opportunity for practitioners to gain a better understanding in how to create academic expectations. Practitioners mentioned this subcode eight times, sharing that remote learning created personal connections that never happened before, connecting over shared stories of family vacation spots and activities. Jen experienced more families participating in Committee on Special Education (CSE) meetings during the shutdown, possibly because it was easier to attend through Google Meets or it did not interfere with parent work schedules as much. Interestingly, no parents mentioned this subcode.

Families Increasing Time Together. Each of the parent interviews described how the increase in time together was a positive experience for each family. Practitioners mentioned this subcode twice and parents mentioned this subcode three times. A common sentiment was the shutdown provided an opportunity for the simplicity of being present together.

Parents Learning how Their Child Learns. Helping their child with remote learning provided parent participants an opportunity to learn how to support their child academically and with support services. Practitioners did not mention this subcode, while parents mentioned it five times. Parents Donna and Wendy talked about how normally the school takes care of academic support, in addition to other support services, and they just see the end result grade. The shut-down meant parents were able to sit next to their child, observing the entire learning process.

Feeling Proud of What Students and Practitioners Were Able to Accomplish. The amount of adjustment everyone was expected to make in a short amount of time led to a feeling of pride among participants. This subcode was mentioned three times across practitioner interviews and three times across parent interviews. All three parent interviews, along with Anna and Emma, talked about feeling like everyone did their best and were proud of what everybody was able to accomplish in spite of the challenges..

Emotional Support Among Colleagues. Practitioners expressed gratitude for the support they received from their colleagues. This subcode was mentioned twice by practitioners. The opportunity to build relationships was noted by Jen, as she reflected on her positive experiences. Especially in the beginning of the shutdown practitioners who were all new to

using technology in that capacity reached out to each other. In addition, there was a greater level of patience with each other, understanding that everyone was experiencing similar challenges.

Challenging Experiences

The amount of change and adjustments for families, students and practitioners led to many challenging experiences. Challenging experiences were mentioned 56 times across interviews. Due to the various challenging experiences participants discussed, this made it necessary to divide the code into the following seven subcodes: children waiting for practitioners to learn how to utilize technology, academic gains disrupted, families unable to consistently communicate with practitioners, children not socializing with peers, parents uncertain of their effectiveness as practitioner, practitioners uncertain of their effectiveness at remote teaching, and feelings of isolation.

Children Waiting for Practitioners to Learn How to Utilize Technology. None of the parents discussed this challenge, however, practitioners felt a pressure to learn the technology as quickly as possible because students were waiting. Practitioners mentioned this subcode five times.

Academic Gains Disrupted. Academic gains were noted as being disrupted because first students had to learn technological things, like accessing Google classroom. Practitioners mentioned this subcode five times, while none of the parents expressed this as a challenge. The concern of practitioners was how much time was spent teaching students how to navigate technology. As Betsy experienced, if a student turned in a blank assignment it was hard to determine if it was because they did not understand the material or did not know how to enter answers.

Families Unable to Consistently Communicate with Practitioners. None of the parent participants expressed this being a challenge, but practitioners mentioned this subcode five times. All of the practitioners had at least one student they were unable to consistently communicate with. In some of those cases there was no communication directly with the student and practitioners had to rely on communication with parents. In other cases, no matter how many emails or texts were sent, there was no response from students or their families. Due to the nature of the pandemic everyone was living in, practitioners tried to be patient with the inconsistent participation.

Children Not Socializing with Peers. The remote learning model meant students were not interacting with peers as often as they were before the shutdown. Practitioners mentioned this subcode twice and parents mentioned this subcode eight times. All of the parent participants noted a lack of peer socialization outside of any Google Meets. While Wendy said her child was fine to not have peer socialization, she worried about her child being too much in her comfort zone. Parents shared that their children often preferred to be on their own rather than interact with peers. The lack of peer socialization was something the children seemed fine with, but the parents worried about. All parents talked about worrying how their children were going to interact in social situations when there was a return to in-person learning. Each of the parents

discussed with their children during the shut-down how at some point they would be going back to school.

All the practitioners tried to address the lack of peer interaction opportunities through social skills lessons. Some of the social dynamics did move from the classroom to the Google Meets, according to Anna and Diane, where students who annoyed each other in-person also annoyed each other during the Google Meets. Managing behaviors through Google Meets was much more difficult than when practitioners were in school with the students.

Parents Uncertain of their Effectiveness as a Practitioner. Parents spoke of the importance of patience they needed to have with themselves during the shutdown, mentioning this subcode three times. Practitioners mentioned this subcode twice. Practitioners emphasized how parents needed to feel like they could reach out to practitioners for help. In fact, practitioners felt parents needed to feel empowered in their own ability to step in for the practitioner to provide direct support.

Practitioners Uncertain of their Effectiveness at Remote Teaching. None of the parents mentioned this subcode, but practitioners mentioned it nine times. All felt a sense of accomplishment for what they were able to do during the shutdown, but worrying if they had done a good enough job. Whether practitioners were teachers or support services, they expressed uncertainty in what they should expect from themselves and what activities would have the most value. The uncertainty around COVID-19 meant uncertainty in other areas of practitioners' lives, even areas where they typically were confident, like their jobs.

Feelings of Isolation. Communication only through technology, like Google Meets, Zoom, and texting, resulted in participants feeling isolated during the shutdown. Practitioners mentioned this subcode seven times and parents mentioned this subcode ten times. If parents socialized it was to relatives over FaceTime, otherwise they just stayed with those in the same household. Parents experienced difficulty not having typical activities like museums and playgrounds, as well as cautiously going to places when things slowly started to open. Parents all wondered about how the isolation during shutdown would affect their children's transition back to in-school learning. Practitioners all expressed how in spite of contact with colleagues there was a sense of each feeling like they were on their own. Diane shared how in spite of contact with her team it was not until the end of the shut-down that she learned how members of her staff already knew how to use some programs that Diane was spending a lot of time teaching herself.

Discussion and Implications

This study investigated the lived experiences of teachers and caregivers of students during the COVID-19 pandemic in the spring of 2020. Through the lens of Brofenbrenner's (1979) Ecological Systems Theory we can begin to understand how the different layers of our world shifted due to the pandemic, and what influence these shifts had on our students with a diagnosis of ASD. Since these shifts began with the discovery of COVID-19 and its spread over time, the discussion will move from the outermost layer (chronosystem) through each layer towards the individual, illustrating the dynamics of ecological systems theory and each layer's sensitivity to the next.

Chronosystem

Interviews captured the lived experiences of the parents and practitioners in June of 2020 (approximately 3 months into the pandemic). COVID-19 transmission and its impact on individual and group behavior was evolving daily in public briefings at the local, state and federal level. These public briefings over time were used to help families and practitioners discuss the pandemic with the students. Families and practitioners discussed how they tried to help students comprehend COVID-19 and its influences on society. A variety of resources, including the nightly news, discussed by Anna, were used to help students understand why students needed to participate in school virtually, and what safety precautions were needed to avoid contracting the virus.

The uncertainty of the duration of the pandemic led practitioners to question what/how resources were being utilized, how services were being delivered, and recommendations to support student achievement. The state was updating schools and the community on restrictions to activities every two weeks, creating uncertainty in establishing home and school routines, parents' directives to work from home, and the ability of parents and practitioners to provide educational services and support for students with ASD. As the pandemic continues, practitioners must be sure to apprise themselves of their state or school district policies to ensure they are prepared to provide appropriate services to their students and their families.

Macrosystem

The macrosystem pulls together cultural and societal beliefs that provide context, which can determine the efficacy of collaborative relationships in the deeper layers of the system. During the COVID-19 initial shutdown there was discussion and debate around essential versus nonessential workers, vulnerable populations, and necessary services to support families during this crisis. These determinations influenced the family-school partnerships ability to share roles, responsibilities, actively collaborate, communicate, and provide interventions for students learning (Garbacz et al., 2015; Rispoli, Mathes, & Malcom, 2019). Practitioners discussed consistency of interactions that waxed and waned throughout online instruction. They noted the increased participation when families were able to collaborate on a student's goals and supports. Parents discussed how their ability to sit with their child during instruction increased the quality of online instruction for the students. The ability to support their child during online instruction is heavily influenced on how society and cultural beliefs viewed their role in the community as a whole in terms of essential workers (e.g., health care workers, first responders, grocery store employees) as discussed in the exosystem. Practitioners could work with families to develop plans that would allow them to work with their children at times that are convenient for them. If that is not possible, practitioners could also provide families with tips for supporting them in asynchronous activities (those that occur at their own time and their own pace).

Exosystem

The exosystem is the relationships among community organizations that do not directly involve the individual (Bronfenbrenner, 1979). It is here where we can see how society defines essential versus nonessential workers, and how this influences workplace flexibility, and available resources for families. All of the families described doing the best they could when trying to

balance work, home, and school. Two of the three moms were able to work from home, and also had partners that worked from home allowing for some flexibility in their ability to support their children. One of the parents worked a night shift at a hospital limiting the time she was able to support her child online. Three of the five practitioners also had school age children of their own that needed support in the home increasing stress and anxiety.

The effects of COVID-19 impacted the availability of community resources. Families and practitioners discussed the halt of community supports and services increasing anxiety, and stress in the home, aligning to the findings of Courtenay and Perara (2020). Social services such as behavioral therapy, psychological supports and medical services were being provided through a teletherapy model (Courtenay & Perara, 2020), limiting access to face to face services that provide direct interactions to model, and support methodologies and interventions for students with ASD. This greatly impacted the dynamics of the mesosystem by shifting how students regulated behaviors in a new environment, with parents taking on the role of practitioners (Courtenay, 2020). Schools should work with families to provide them appropriate training in how to best support their children in continued pandemic times. They may also consider ways to improve practice through teletherapy models, to potentially use this method going forward, even in non-pandemic times.

Mesosystem

The mesosystem is the relationship between organized groups such as school and home. The COVID-19 pandemic has forced schools and homes to collaborate online through synchronous (at the same time) or asynchronous (not at the same time) activities. The freedom to organize the collaboration between home and school allowed for some flexibility. The use of Google platforms such as Google Classroom, Gmail, and Google Slides allowed for the school and family to collaborate on the establishment of schedules, routines, and activities to meet the student's needs. Such platforms that promote communication may be of continued use even in non-pandemic times to best support the needs of families.

While there was the ability to collaborate it was duly noted that there was a shift of the shared responsibility in the delivery of services. Teachers' shared responsibility of student engagement varied with shared expectation to meet educational goals, learn and teach through new technologies, and provide useful resources to support families. Success of shifting to a home setting for educational purposes was influenced by the student's perception of home, parents as practitioners and parents working from home. The COVID-19 pandemic forced some families and practitioners to align their expectations and collaborate more effectively, which can have a positive impact on student development such as anxiety (Cook et al., 2019; Gobrial & Raghavan, 2017), behavioral regulation (Cummings, 2017; Sheridan et al., 2013), and academic outcomes (Eskow et al., 2018). How these collaborations have influenced the relationship of the individual and the caregivers is discussed in the microsystem. Schools and teacher preparation programs should consider providing practitioners with explicit training on the best ways to collaborate with families.

Microsystem

The microsystem is the direct interaction between the individual and others in their environment (peers, caregivers, teachers). In March and April 2020 (the first few weeks of

virtual instruction) interactions between practitioners and students were limited. Initially the focus of instruction was on asynchronous activities such as receiving and completing paper and pencil assignments versus synchronous activities that required engagement in lessons in an online learning platform. There was a need for more feedback for students and families as to whether or not students had met the expectations of the assignment. The continuation of the pandemic shifted to practices that involved more synchronous lessons and activities, allowing for teachers to model activities and concepts and provide feedback on students' understanding. The increased use of technology to meet synchronously with students increased both the practitioners' and students' confidence in effectively utilizing technology as a learning tool. This should encourage teachers to utilize technology more frequently, even in a situation where, for example, a student is absent from school, or in lieu of a snow day.

Families found that increased time to interact with their child provided them with a better understanding of their child. Parents reported gaining a better understanding of how their child learns, and what supports they need behaviorally and academically, which supports previous research indicating that families appreciate having a better understanding of their child's school performance (Parenteau et al., 2020). There was a sense of pride in their students and the family's ability to grow and learn together under the COVID-19 circumstances. While research supports the positive outcomes of family mediated intervention (e.g., Barry, Holloway, Gunning, 2019; Bass & Mulick, 2007; Bradshaw, Koegel, & Koegel, 2017) practitioners and families were forced to collaborate under the conditions of a short period of time, and without a clear training methodology or intervention on which to collaborate.

The relationship of the individual to peers was impacted the most by the pandemic. Students were limited to online interactions with peers or no interaction at all. Practitioners noted that while students needed to be working on social skills in online social groups, it was difficult to teach social communication skills without the ability to physically interact with others. Skills such as perspective taking (Baron-Cohen), and planning for and executing a goal (Freeman et al., 2017) are difficult skills to address in isolation. In addition, families were concerned with how this would impact the development of the individual and the transition back to social spaces when the pandemic ends. However, the parents did report that they appreciated having increased "family time," a finding that supports previous research indicating that families enjoyed spending more time together during the pandemic (Pelicano, et al., 2020).

Individual

Students with ASD were provided with special education supports and adaptations through online educational platforms. Students were able to join Google Meets individually or in small groups to interact with practitioners and peers to maintain educational engagement. These educational experiences afforded practitioners opportunities to provide students and families with academic content; what was difficult was providing families and students opportunities to engage in communication based on communication needs (Norrelgen et al., 2014) and social needs (Baron-Cohen et al., 1985; Banich, 2004; and Frith & Happe, 1994).

Families reported the need to be physically present to support their children with on task behaviors during lessons. Practitioners also reported a higher level of engagement of the individual when caregivers were present. The impacts on the individual's academic

achievement have not been formally measured; additionally practitioners did not keep data on the student's progress towards their individual goals in the IEP, or curriculum mastery. While practitioners have expressed satisfaction in their ability to adapt during the COVID-19 pandemic, they still have questions about the effectiveness of online instruction for students with ASD. Schools should consider developing assessment procedures to evaluate student growth and progress in online instruction.

Limitations and Future Research

This study was limited by several factors. First, the number of parents and practitioners who participated in the interviews were from one school within one district. The participants may not accurately represent the views of teachers of children with ASD across the state or country. Future research should look to include additional participants from various geographic regions, and around the world. Additionally, all the respondents were female. Although this is not entirely unusual, considering that special educators are more often female (United States Department of Education, 2019), the opinion of male participants, including professionals and family members, is valued and should be included in future research. Furthermore, the interviews were conducted at one point in time; it would be beneficial in the future if a series of interviews could be conducted over time, in order to understand how their families' and practitioners' feelings changed over time.

Despite the attempts of the researchers to offer a choice of who would conduct the interviews, the use of a teacher within the school district as interviewer may have resulted in participants feeling uncomfortable providing their true opinions, for fear of repercussions from the school district. We decided the ability to create familiarity and context for the interviews was worth this potential limitation, but future research may have an interviewer with no relationship to the participants. Finally, future research should explore whether the strategies and techniques identified by practitioners in this study should continue to be used, even in non-pandemic times. For example, practitioners indicated that the technology was exciting and something they would explore using with their students in the future. It is crucial that research explore these technologies to determine their efficacy with students with ASD. Additionally, the findings have identified that there is great opportunity for collaboration between families and practitioners; these should be explored further.

Conclusion

The year 2020 ushered in a pandemic where the spread of the novel coronavirus shut down face-to-face educational instruction and forced school districts to move to online instruction. This pandemic has exposed vulnerabilities that exist in society, including how ecological systems influence an individual's educational experience. This study examined the lived experiences of teachers and caregivers of students with ASD during the COVID-19 pandemic in the spring of 2020. Through the lens of Brofenbrenner's (1979) Ecological Systems Theory, we can see how the different layers of our world shifted due to the pandemic, and how this influenced families and students with ASD. Understanding this complex system for students with ASD provides a lens where we can look to support the individual. This can be done by

shifting attention to the abilities of individuals and how each layer can promote progress and productivity in society.

This research provided the positive experiences of families' and practitioners' ability to collaborate around the needs of the students with ASD academically, behaviorally, and socially. It is the forced collaboration that shows the power of building positive relationships between caregivers and practitioners that positively influences the outcomes for students with ASD. While this pandemic forced collaboration in a short time and with limited resources, this collaboration can help mediate the uncertainties related to jobs, communities, and policies that influence the education of students with ASD. Future research should look deeper at how each level of the ecological systems theory can support the needs of people with ASD and how we can utilize their abilities and talents in communities.

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Appendix A

Codebook

Theme	Code	Subcode	Example
COVID-19	Students' awareness of COVID-19		"Yes so I think they understood that it was people were getting sick and in hospitals and we couldn't go anywhere. I think they understood they could not go to school…" Diane Interview
	How families addressed COVID-19		"I said school right now is closed because you know people getting some viruses…" Donna Interview
	How practitioners addressed COVID-19		"I provided social stories…like what Covid is in simple language and how to be safe in that but to have 1 to 1 conversations, no I did not do that." Emma Interview
Conflict of no control versus freedom	No control	Unknown length of shutdown	"That was their biggest thing, the unknown of when are we going back." Diane Interview
		Waiting for guidance	"Like we literally as classroom teachers had no instruction, no guidance." Anna Interview
	Freedom	Create own schedule	"…why don't I just open up [Google Meet] for an hour a day and anybody who wants to join in." Betsy Interview
		Create expectations	"My goal was to have them sign on to see face to face 3 times a week so I tried to make activities very engaging and fun and I would intertwine like academics into it." Diane Interview
Setting	School		"There is all day a schedule, there's a routine." Jen Interview

Home	Child perception of home	"It is very hard just because my kids at home are completely different than at school because of their behavioral issues." Ruby Interview
	Parent as practitioner	"I feel like families wanted all of this stuff from us, but the basics of a home life and function was not met so the frustration level was up high so how can we best help you survive during this time and make it work for you at home." Emma Interview
	Working from home	"Balancing home life as a parent with 2 children who are in kindergarten and 2nd grade and being able to be available and you know mindful of the needs of my kids as students." Emma Interview
Student engagement	Interaction with peers	"...my students who typically have social emotional deficits it is often related to their ability to read social cues and respond to facial expressions...and being online we lose some of that." Jen Interview
	Interaction with practitioner	"...I would say 7/9 [students] were involved and it was 1 student was really involved but the others were hit or miss [of the middle school caseload]" Emma Interview
	Interaction with environment	"As long as me and my husband are there to work with her she is just finishing stuff. If we have to go with the boys to do something, she just leaves it." Ruby Interview
	Disengaged	"Because some of the work he knows, it's easy for him to do it, it is just to get him to do it is the hard part." Ruby Interview

Technology use and preparation	Unlimited access to technology		"I was inundated by different resources that were just sent to me and… probably it was the management if that that I found challenging because there was so much." Jen Interview
	Limited access to technology	Free resources	"Through the elementary school one of the general education teachers found access freely though Teachers Pay Teachers if the principal had done some kind of webinar so that was initially how we got some free stuff." Emma Interview
		Access to printer	"I don't have a printer. My printer just broke." Emma Interview
		Access to internet	"I am a person who has a JetPack, I don't have Spectrum so my data runs very poor by the end of the month and then I don't have really access so how can the district support somebody like me to have access all the time and not pull data and stuff away from my own family to support my students." Emma Interview
	Practitioner Preparation	Instructional methods using technology	"It would be a preset activity. This is what we are going to talk about in our Google Meets tomorrow and then I would find some kind of instructional video." Anna Interview
		Preparation	"...sent home as many pin numbers to websites kids already using, making sure they got their chromebooks and started with existing websites they already knew." Betsy Interview

Perspective	Positive experiences	Time to learn technology and apps	"I don't know if they [the students] are going to do it but at least I will learn." Betsy Interview
		Teaching students how to use Google classroom	" I would love to start every single year with the Google classroom, teaching the kids how to sign on, what does it look like…" Diane Interview
		Practitioners and families developing a rapport	" I made a lot of personal connections with them [families]…if I was in school I would not have had that time because the lines of work hours were blurred completely." Diane Interview
		Families increasing time together	"To just spend extra time with them…as a family." Ruby Interview
		Parents learning how their child learns	"That is positive thing so you can you know understand more what is his weakness and try to help him more then also you can learn the experience too." Donna Interview
		Feeling proud of what students and practitioners were able to accomplish	"I am kind of proud of everybody, kids too." Anna Interview
		Emotional support among colleagues	"Reaching out to other coworkers…what were they doing, that was the best thing." Diane Interview
	Challenging experiences	Children waiting for practitioners to learn how to utilize technology	"It meant long days, 7 days a week to get up to speed or to try to learn new techniques." Jen Interview
		Academic gains disrupted	"I didn't really know what to expect from myself or from them [students] so sometimes they would send me back from Google classroom completely blank things but at least they went in, they went through the

	movements…learning Google classroom." Betsy Interview
Families unable to consistently communicate with practitioners	"…I had no way of tracking if they were accessing the materials or not so it was hard for me to really see so I just kept emailing and trying to reach out." Emma Interview
Children not socializing with peers	"…but mostly that she does not get that socialization with others has been the hardest part because you want them to have that." Wendy Interview
Parents uncertain effectiveness as practitioner	"I know sometimes you send them to school and you think you have therapies, physical, occupational, and speech therapy. Everything they do then make sure you try, to know that is not your skill but somehow you still have to you know be patient and learn and listen and do the best of those skills too to help your child." Donna Interview
Practitioners uncertain effectiveness at remote teaching	"…so that was a big part for me did I feel like I did my best? I think so but I don't know there is always more I could have done I guess." Emma Interview
Feelings of isolation	"A lot of the department initially started to share materials and then everybody kind of just went off on their own I think just to survive." Emma Interview

The Numbers Don't Lie – Or Do They? Small Sample Size Hides Lived Reality of Representation of Native American Students in Special Education

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Abstract

Native American students appear to be overrepresented in the special education population of PreK-12 schools. In 2021, the National Center for Education Statistics (NCES) reported that a higher percentage of American Indian/Alaska Native children were served by the Individuals with Disabilities Education Act (IDEA) than children in any other racial/ethnic group**.** In this study, the researchers surveyed and interviewed teachers and administrators in schools with high Native American student populations. They analyzed the survey results and anecdotal observations and examined the relationships among the IDEA Special Education Indicator Reports, the provision of special education services, and Native American values and contextual factors. According to this State's Special Education Report Cards, almost without exception, schools with a high American Indian enrollment had much higher Child Count percentages. For example, it appeared that the State average for Child Count is 14.67%. However, in several schools with high Native American enrollment, the Child Count percentages were 20.75, 21.2, 21.17, 25.07, and 27.14.

Keywords: minorities, special education, Native Americans, disabilities, overrepresentation

The Numbers Don't Lie – Or Do They? Small Sample Size Hides Lived Reality of Representation of Native American Students in Special Education

Concerns about minority overrepresentation in special education programs have existed for over 40 years. Ever since the landmark case, *Larry P. vs Riles* in 1979 (Yell, 2019), questions have been raised about how students are evaluated and determined eligible for placement in special education programs. Many studies have reported that Native American students are overrepresented in the special education population of PreK-12 schools (Zhang & Katsiyannis, 2002; Hibel, Faircloth, & Farkas, 2008; Ford, 2012; Connor, Ferri, & Annamma, 2016). However, Morgan, Farkas, Cook, Strassfeld, Hillemeier, Pun, Wang, & Schüssler (2018) found the opposite to be the case, that, "children are under identified as having disabilities based on their race or ethnicity" (p. 261). However, the problem with the Morgan study was that researchers controlled for socioeconomic factors. Unfortunately, poverty level and other markers of economic status cannot be ascertained when identifying special education students. Historically race and socioeconomic factors have been cofounded in research. According to the National Center for Education Statistics (NCES), during the 2018-2019 school year, when special education placements were compared by race/ethnicity, the percentage of students in special education was highest for Native American/Alaskan Native at 18% (retrieved from https://nces.ed.gov). Why do these special education identification issues still

exist? What can be learned by the mandated data collection, and does it mirror the experience of teachers and administrators who work one- on-one with students? The researchers decided to take a closer look at potential overrepresentation of Native American students in special education in their home state. For the purposes of this study, the researchers have chosen to use the term Native American. Some selected references, however, may use different terms to refer to this population.

At first glance of the available statistics, there did not seem to be many concerns regarding overrepresentation in special education placements of Native American students in the State studied. Every year, each state has to provide a State Performance Plan/Annual Performance Report: Part B for State Formula Grant Programs under the Individuals with Disabilities Education Act, (https://sites.ed.gov/idea/spp-apr/). On the most recent report, which is based on 2018 data, the State was not out of compliance with disproportionality on the last State Performance Plan as a whole. Each state provides information on 17 Indicators, two of which have to do with disproportionate representation by ethnicity. The State met the target for Indicator 4B: Rates of suspension and expulsion, including discrepancies by race or ethnicity. However, it should be noted that the data collection criteria are discordant with the reality of the school district size. Using State criteria, only three school districts met the State's minimum *n* size. This pattern of misrepresentation and underrepresentation occurs throughout the State's reporting and produces an inadequate and often contradictory picture.

Additionally, in that same report, Indicator 9: Disproportionate Representation of students in special education including race or ethnicity: all of the State's 149 Local Educational Agency (LEAs) were included in the analyses. Of these 149 LEAs, only 32 met the minimum *n* requirements to be calculated. Once again, the *data* are only capturing about twenty percent of the experiences of the schools. Note that many LEAs in this State have fewer than ten students with a disability of a particular race/ethnicity. Of the 32 districts reported only one was identified as having disproportionate representation, but none of the districts were identified with disproportionate representation of racial and ethnic groups in special education and related services that is the result of inappropriate identification. In the official data, the State met the target, but this does not match the lived experiences of providers. Hence, it is important that the quantitative data gathered at the State reporting level be augmented with qualitative by teachers and administrators in the schools.

Research Questions

The researchers developed the following research questions:

1. Do state data misrepresent what is happening with respect to special education identification of Native American students?
2. What factors influence the identification of Native American students for special education?
3. What factors negatively impact Native Americans in a Midwest state?
4. Do Lakota values play a role in identification of disability or provision of special education services for Native American students?

Method

Due to the rural nature of this state, the researchers analyzed existing demographic trends and gathered qualitative and quantitative data and conducted key informant interviews related to special education enrollments in schools with a high Native American population. For purposes of this study, high Native American enrollment is considered anything at or above the state demographic for Native American ancestry. The researchers examined official national and state special education reports, but it became clear to the researchers that the official reports did not reflect the data needed to address the concern of overrepresentation of Native American students identified with disabilities. To augment the small *n* size on many official reports, the researchers developed a survey to identify significant themes related to this topic.

Survey Data Collection

Participants

A purposeful sample was collected from administrators, special education directors, and special education teachers who work in schools with high Native American enrollment. We strategically surveyed school districts with higher-than-average Native American populations and Child Count percentages. The original survey was sent out to the three largest districts in the state along with targeted public schools districts with the highest percentages of Native American students ($n = 18$). Follow-up email messages were sent to administrators and special education teachers at the schools noted above. Quantitative information was completed by 11 respondents, and qualitative data was completed by nine respondents. Of the 11 participants, ten were from public schools and one was from a Native American boarding school. Nine identified as White American, one as Native American, and one Asian American. Ten of the respondents were female and one was male. Five were in the 51–60-year-old age group. Ten of the respondents were special education teachers and one was a Director of Special Education. Eight of the schools do not offer the Lakota or Dakota language while three do. Demographic information about the participants is presented in Table 1.

Table 1
Demographics of Survey Respondents

Demographics	**N**
Race	
Caucasian	9
Native American	1
Asian American	1
Role	
Special Education Teacher	10
Director of Special Ed	1
Gender	
Female	10
Male	1
Age	
Below 50	6

51 +	5

Measures

The survey instrument (see Appendix) used was created based on the ideas of the Lakota values, the American Indian values from Yellowhorse (2018), and the contextual factors identified by Hibel (2008). The survey was developed by the researchers and reviewed by the Director of the Native American Circle Program at a local university, and a faculty member who is Native American and currently an active member of a tribal community. After reviewing and providing feedback, these individuals validated the survey for use. The instrument consisted of 15 items - 11 items were selected-response and related to demographic information about the participant, the participant's school, and Native American values. Four questions were open-ended regarding placement of Native American students into special education programs and cultural identity. Through open-ended questioning in the survey format, the researchers received first-hand evidence behind, and oftentimes in lieu of the numbers.

Procedures

The researchers obtained Institutional Review Board (IRB) approval to conduct this research study. The survey questions were reviewed by academic and community representatives. The link to the survey was emailed directly to administrators and special education teachers along with the letter explaining the importance of the survey and seeking permission for participation in the study. A follow-up message was sent within three weeks of the original request.

Results

Results of this study yielded both quantitative and qualitative data. Together these data help us understand the lived experiences of providers delivering special education services to Native American students in a rural Midwest state. The first research question addressed the representation of Native Americans in official reports. According to the U.S. Census Bureau (2020), American Indian and Alaska Native alone account for 9.0% of the total State population. According to the State Department of Education Indian Education website, there are five Bureau of Indian Education (BIE) schools, 15 tribal schools, two non-public schools, nine public schools on tribal reservations, and 12 public schools with the highest percentages of Native American student populations. In 2019, the State public school districts had school district ages 3-21 years old Child Count of 22,085 students while the statewide student population according to the Fall P-12 Census count was 139,442 students. This resulted in a P-12 percentage of Students with Disabilities (SWD) at 15.84%. In the fall 2019 Child Count for PK-12, there were 3,396 students who were Native American, which is 15.38 % of the Child Count. According to the State Special Education Report Cards, almost without exception, schools with a high American Indian enrollment have much higher Child Count percentages. For example, the state average for Child Count is 14.67%. However, in several schools with high American Indian enrollment, a sample of some of the Child Count percentages were School A, 20.75%, School B, 21.2%, School C, 21.17%, School D, 25.07%, and School E, 27.14% (https://doe.sd.gov/reportcard/).

The second, third, and fourth research questions address the qualitative factors related to the identification of Native Americans in special education. The survey was designed to highlight the values of the tribes present in our state. Drawing from Joseph Marshall's *Lakota Way,* respondents ranked nine Lakota values most important for Native Americans. The results of the ranking indicated that "Wisdom" and "Caring and Compassion" ranked highest. Additionally, respondents were asked to rank factors, on a 6-point scale, which they felt negatively affected Native American populations with the state. The findings indicated that for the factors that negatively impacted Native Americans, the highest mean was 4.0 for "Family Structure" with the second highest (3.8) being "Lack of Appreciation from Non-Native Americans", see Table 2.

Table 2
Factors Negatively Impacting Native Americans in Midwest State

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Colonization	1.00	6.00	3.30	1.79	3.21	10
2	Boarding Schools for Native Americans	1.00	6.00	3.50	1.75	3.05	10
3	Poverty	1.00	6.00	2.90	2.02	4.09	10
4	Unemployment	1.00	6.00	3.50	1.43	2.05	10
5	Lack of appreciation from Non-Native Americans	1.00	6.00	3.80	1.25	1.56	10
6	Family Structure	2.00	6.00	4.00	1.67	2.80	10

Qualitative Responses - Survey Open-Ended Questions

Four open-ended questions were included in the survey. The open-ended questions were reviewed, and a thematic analysis was performed on the responses.

Question 1: What cognitive and behavioral factors do you feel influence the placement of Native American students in special education? Two themes, lack of proper instruction and lack of early intervention, were identified by 56% of the respondents on the open-ended survey question related to cognitive and behavioral factors.

Lack of proper instruction

Barriers to success were mentioned by respondents. Some of these barriers were due to students' (and families') ability to show up, and not indicative of the school system. One respondent stated her frustration in providing instruction by stating the barrier stems from "Not attending school, missing classes, not completing assignments." (Survey respondent #2).

Another respondent believed that students are missing something (although she does not state specifically if it is culturally based or not), to obtaining the education they need "I believe Native American students are not taught in a way that they can learn appropriately and be successful in school...All in all, I think if you look at actual cognitive and behavioral factors there would be far less in special education, but due to lack of proper educational services and behavioral interventions that cognitive and behavioral delays are created and/or amplified by the system and these students end up qualifying for special education services." (Survey respondent #3).

Respondents felt that working with students and their families and acknowledging factors such as students switching schools was important for creating a learning environment. One respondent suggested, "The factors that guide a team decision is based on how students respond to current curriculum in the regular classroom and the discrepancy between cognitive and achievement to meet eligibility." (Survey respondent #7). Another respondent acknowledged that, "Students have had upheaval in their lives-moving from school to school and to different foster families, leaving emotional and academic gaps for them." (Survey respondent #8). Additionally, another respondent suggested that despite relocation, "...Many are able to close the gap with quality instruction if they have family support and good daily attendance in school." (Survey respondent #9).

Lack of Early Intervention

The second major theme that emerged from the question on cognitive and behavioral factors focused on the lack of early intervention. Simply put, one respondent stated, "Not having early childhood educational experiences also affects their ability to be successful from the beginning." (Survey respondent #3). Other respondents identified prenatal and family barriers which created a lack of early intervention, "Lack of opportunity and experience in the home." (Survey respondent #4). "Missing normal developmental milestones…" (Survey respondent #5). "Exposure to drugs and alcohol during pregnancy…" (Survey respondent #8).

Specifically referencing Native students, one respondent suggested that "We have more students enter the school system with learning gaps." (Survey respondent #9).

Question 2: "What school contextual factors do you feel influence the placement of Native American students in special education?" One theme, "Lack of Understanding of Native Americans" was identified by 33% of the respondents in regard to school contextual factors. Five of the respondents repeated the same information in regard to early intervention and lack of proper instruction again in this section.

Lack of understanding of Native American culture

One respondent showed her frustration with reporting by stating, "District monitoring of placement rates for subgroups, teacher self-definitions of what constitutes effort." (Survey respondent #2). Lack of cultural responsiveness and prejudice and bias was stated passionately by one respondent,

> *Lack of understanding of Native American cultures and/or want/care to understand. Avoidance of Native American cultural and people. There is a disconnect between Non-Native and Native people-no communication or working together...Many teachers have no clue where these kids come from and the lives they lead. They have no empathy or willingness to make things work. Native culture is about people not policies/rules and in the school system that is most important...For Natives the person is most important and making them feel important...There is also racism/stereotyping. People don't want to admit it, but it is here. I am a light skinned Native so people will say things to me. They say that's just how those Natives are....They blame the culture, the child, the family, but never look at what changes they can make to the education system to make it better for the Native child. They don't relate the education curriculum to their world, but to the world the teacher grew up in. (Survey respondent #3).*

These sentiments were echoed by another respondent who stressed coordination between all areas for students' school success, "Lack of cultural understanding. Lack of proper communication with home, student and school." (Survey respondent #4).

Question 3: "What family contextual factors do you feel influence the placement of Native American students in special education? Please include any thoughts on what role the perceptions of traditional Native American values, mentioned earlier in this survey, may play in this process, the following information was gathered."

Disconnection between Native American Families Values and Schools

One theme emerged in regard to family contextual factors. This theme was a disconnection between families and schools. One respondent suggested that "Attendance and mobility-family is important and requires lots of moving to see various family members or staying home to be part of the family instead of attending school educational opportunities at home." (Survey respondent #2).

Speaking directly to Marshall's Lakota value of humility, one respondent summarized the disconnect between Native values and the current school system,

> *One of the values of Natives, almost an innate value of humility I believe plays a role. In many ways, school is set up to counter this value. Participating out loud in class or standing up in front of the class to present is often key grading of the curriculum. A child taught humility will not feel comfortable participating and presenting. Often the relationship between the family and school is strained because of the lack of communication between school and Native family/community...In Native culture, respect is earned. Even though also it is to respect your elders, it is different in this situation. Respect is demanded, but not returned...Praying is important to our culture and with schools as we know there is a separation of church. I am not allowed to smudge and neither are the students. As far as home lives affecting school, I have been able to reach those students with really tough home lives, so that cannot be an excuse. The only time is when the child has excessive tardies and absences. Then CPS should get involved….I also believe historical trauma plays a role. We have had*

> *training on this, but the responses I heard after were more if it doesn't exist or affect our students. This is not true*. (Survey respondent #3).

Another respondent reiterated differences in cultural behavior "Lack of eye contact, silence and slower response when questioned." (Survey respondent 4).

Historical trauma which arose from the abuses many Native parents and grandparents suffered through placement in boarding schools and stripped their culture, create additional barriers for current children in the school system. Suggested by one respondent, "Surviving and trying to have basic needs met, seems to outweigh academic needs and support oftentimes. Sometimes my impression from Native families, have been that school is something the white man is trying to do to the Native children, an attitude that may be passed down through generations from the boarding school experiences." (Survey respondent #8).

Balancing traditional beliefs and Western education can may result in some Native parents' choice not to enroll their children into special education. This was suggested by one respondent who stated, "Some parents/guardians are hesitant to place their children in special education under the category of Other Health Impaired for qualifying conditions such as ADHD because of traditional beliefs. If a trusting relationship can be established, parents who also struggled in school do want their own children to have support and agree to services/placement. (Survey respondent #9).

Question 4: "What support programs do you have in place in your schools to help students address cultural identity?"

No particular themes emerged from the question. Seventy-eight percent of the respondents indicated that their schools had some type of cultural events available for their students. Thirty-three percent have the Lakota or Dakota language offered as a class at their schools. Other respondents mentioned cultural events such as traditional prayers, dances, and dress, such as taking field trips to a Pow Wow. Thirty-three percent of the respondents indicated that they employed some type of Native American Liaison or Coordinator in their schools.

Key Informant Interviews

To further substantiate the information gathered from the surveys, participants had the opportunity to volunteer to be interviewed. Two Key Informant interviews were conducted. One special education teacher from a large district was a White American male, while the other from the smaller district was a Native American female.

In regard to contextual factors, both interview participants identified the Lack of Early Intervention, Lack of Proper Instruction, Lack of Appreciation for Native American Values, and the Disconnection of Native American Values in the School Setting as significant themes. The teacher at the larger school district indicated more support in his school including Lakota language being offered at the high school. The teacher at the small school indicated a lack of supports in her school other than Title VI programs and noted the lack of Head Start openings in the community. (Special Education Teacher Interviews, personal communication, December 12, and December 11, 2020.)

Discussion

This research was intended to expand upon State collected data. Although it is important to protect the identify of students with disabilities in small school districts, the lack of information due to low *n* sizes can create a sense that school districts are meeting all the requirements for the IDEA Indicator Reports when the reality may be different. If year after year, small sized school districts do not receive their actual numbers for the Special Education Indicator Reports, they could be unaware of potential problem areas. Due to the small population of the State and the insufficient quantitative data reported in mandated reports, researchers surveyed respondents in schools with high Native American populations to gain a better understanding of the situation.

Although there are concerns about the official data, there were some findings in this study which were consistent with the literature. The most common IDEA category identified was Specific Learning Disability (SLD) at 70%. This finding was consistent with what Zhang and Katsiyannis (2002) reported on the most common category of disability for American Indian/Alaskan. The findings related to factors that influence special education placements were consistent with Hibel, Faircloth, and Farkas (2008) who reported that the strongest predictor of special education placements is students' academic readiness skills upon entering Kindergarten.

> *Our identification of academic readiness as a determinant of special education referral and placement among American Indian and Alaska Native (AI/AN) in the early grades has important implications for the field. These data indicate that many AI/AN children enter school less academically prepared than their peers. In contrast to factors such as low socioeconomic status or race/ethnicity, academic readiness is more amenable to both prevention and intervention-based approaches prior to school entry as well as in the early grades.* (p.515-516).

Quantitative data suggested that Lakota values of *Wisdom* and *Compassion* were most important to Special Education providers surveyed. Wisdom *Woksape* is defined by Marshall as the understanding of what is right and true and the use of that knowledge wisely. While knowledge is an important part of wisdom, wisdom is believed to be the application of knowledge. Respondents in our research imparted their wisdom from working with Native students and families. Compassion, *Waunsilapi* is defined as caring and sympathizing by Marshall. Respondents often suggested that the educational system lacks compassion (and cultural responsiveness) for Native students and their families. The value of Compassion and Wisdom were the highest ranked by providers in our study.

Qualitative data echoed Marshall's *Lakota Way* themes. Responses to the four open-ended questions highlighted the themes above in addition to values such as Perseverance, *Wowacintanka* and Respect, *Wawoohola*. Respondents commented on the need for teachers to persevere in reaching students and accommodating students' who transfer in and out of the system throughout the year. Additionally, teachers noted that aspects of the school system, such as talking in front of the class, are not aligned with traditional Lakota values. Incorporating

values that respect Native students and families into the curriculum could be helpful in addressing the historical trauma.

State collected data is void of understanding the richness of the experience of Native American students in our school system. Additionally, the data does not address the cultural and curricular challenges that may factor into students being assigned to special education. The importance of State reporting is necessary for funding, but it is insufficient to understanding bias in the system. Hence, this study provides a more thorough understanding of what teachers at schools with high Native American student populations experience on a daily basis. Taken together a more complete picture of the State can be observed.

Limitations and Suggestions for Further Research

One limitation of this study was the small sample size. More responses would have been preferred, but due to the pandemic, many school district teachers and administrators were simply short on time for additional requests. The information gathered from the survey and interviews provided additional information that proved valuable for establishing some consistent themes. Further research could extend this survey to all school districts in the State.

Conclusion and Recommendation for Future Directions

The focus of this study was to bridge the knowledge between mandated data collection and lived experiences of teachers in the schools. Data from rural areas often are eliminated from reports due to the small size of the student population. When data are available, they can often misrepresent the experiences of the teachers in these communities. Our efforts to combine quantitative state reports and qualitative teacher stories has created a more robust picture of Native American students' experience of our Midwest schools.

Programs, projects, and curriculum have been developed to create cultural connects with students and faculty. For example, according to the state's Department of Education Indian Education website, some new initiatives were recently launched:

The *Wookiye* Project began August 2020 for the 2020-2021 school year. The goal of this effort is to create and implement a network of support that will help, aid, and assist teachers as they become proficient in using the Oceti Sakowin Essential Understandings (OSEU), to provide additional support in creating resources that support OSEU standards (https://indianeducation.sd.gov/wookiye.aspx). Another recent initiative is the *WoLakota* Project, which appears to have launched in 2019.

> *WoLakota means peace, balance and coming together. The WoLakota project supports students in high-need schools through guiding educators into better implementation of the Oceti Sakowin Essential Understandings (OSEU) via Culturally Responsive Practices. Lakota Elder Dottie LeBeau states, 'When we approach teaching with one worldview…we create systems of failure in our schools.' WoLakota closes the circle into a system of understanding and success* (https://www.wolakotaproject.org/).

It would be beneficial to examine this topic, specifically the Native American values, again after those initiatives have been in existence for a few years. Additionally, currently it is difficult to disaggregate special education data by race and ethnicity on all IDEA Indicators, such as Least Restrictive Environment. It will continue to be difficult to discern what is happening in special education concerning race and ethnicity in small, rural districts without that information.

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Appendix

Survey

Demographics Information:

Please select one:
___Native American and Alaska Native
___White American
___Black American or African American
___Asian American
___Native Hawaiian and Other Pacific Islander

Please select the item that best describes your role in your school district:
____Superintendent
____Principal
____Director of Special Education
___Combination Administrator including Director of Special Education along with Supt. and/or Principal
____General Education Teacher
____Special Education Teacher

Select one type of school for your employment:
___BIE
___Boarding School
___Public
___Private

Do you offer classes in the Lakota/Dakota language in your school?
___Yes
___No

Please select one:
___Male
___Female
___Other
___ Prefer not to respond

Please select the appropriate age group:
___20-25
___25-30
___31-40
___41-50
___51-60
___61-70
___71-80

___Over 80
___Prefer not to respond

Survey Items:

There are a higher percentage of Native American students in special education programs in South Dakota compared to students who are not Native American. The researchers of this study are gathering information on factors that may be contributing to this discrepancy.

Rating Scales:

Please rate each of the following items on a scale of 1-9, with 1 being lowest and 9 being highest on which values you feel are most important for Native Americans.

___ *Wacantognaka* or generosity
___ *Wotitakuye* or kinship
___ *Wacintaka* or believing in yourself and facing challenges
___ *Woksape* or wisdom
___ Honesty
___ Humility
___ Respect
____ Praying
___ Caring and compassion

Please rate each of the following items on a scale of 1-6, with 1 being lowest and 6 being highest on which factors you feel have most negatively impacted Native Americans in South Dakota.

___ Colonization
___ Boarding Schools for Native Americans
___ Poverty
___ Unemployment
___ Lack of appreciation from Non-Native Americans
___ Family Structure

Open-ended questions:

1. In your school, on average, what percentage Native American students are referred for special education each year?
2. What percentage of Native American students in your school are currently in special education programs?
3. What IDEA special education categories are most common for Native American students in your school?
4. What cognitive factors do you feel influence the placement of Native American students in special education?

5. What behavioral factors do you feel influence the placement of Native American students in special education?
6. What school contextual factors do you feel influence the placement of Native American students in special education?
7. What family contextual factors do you feel influence the placement of Native American students in special education?
8. Do you feel that the perceptions of traditional Native American values mentioned earlier in this survey play any role in the identification of disability in Native American students or the provision of special education services? If so, in what way?
9. What support programs do you have in place in your schools to help students address cultural identify? Please explain.
10. Would you be interested in being interviewed to discuss your responses in more detail?

Software Enabling School Improvement Through Analysis

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Abstract

This study is on data-gathering software for special teachers in local education agencies Grades K-14. Increasing pressure for the use of accountability to follow the effectiveness of meeting educational standards has caused schools to reassess methods of using data and the core technologies surrounding its collection. The amount of data collection mandated by the administration and government requirements frustrates special education teachers. The researchers sought to determine if in-service and preservice teachers would use a software platform for completing a required task, such as creating and sharing lesson plans. The results indicated that most in- and preservice teachers would use a software platform for achieving a required task when given the opportunity.

Study of Data-Gathering Software Use by K-6 Teachers in General and Special Education

General and special educators experience stress from the responsibility for student learning outcomes. Data results and collection to drive the curriculum must be of excellent quality. Developers of software platforms to collect data for educators need to question and observe educators' needs. No controlled studies exist that examine student data software through the eyes of educators, and how educators use it affects student outcomes (Wayman et al., 2004, p.36). Achieving high levels of mastery is high on the agenda in educational programs in higher education and K-12 schools. Recent historical studies include reports on the challenges faced by teachers of testing and data recording.

Newly graduated special education teachers had an opposing viewpoint about the length of tasks, such as individual education plans, behavioral plans, review materials, and annual goals (Mehrenberg, 2013). The research indicated experiential evidence of the overwhelming workload, the lack of actual data gathered by outmoded and often handmade graphs, and the teacher's focus on curriculum and classroom activities caused by the sheer amount of paperwork required.

Demand and Stressors Collecting Educational Data

Because educational researchers prefer to spend time conducting research rather than investing effort in solving technological and data management issues, they often resort to all-purpose general office applications like spreadsheets that do a poor job of data management (Franklin et al., 2011). The data collected in paper forms must be hand entered into an electronic database to

perform statistical analyses. Researchers have entered data in electronic databases for more than 20 years, but up to 75% of researchers still use paper data collection (Pavlović et al., 2009).

Teachers' workload tasks burden them with being clerical workers, lesson planners, facilitators, and curriculum managers, which prevent them from pursuing the enhancement of their teaching skills. Teachers are now required to provide reference sources and class textbooks and prepare innovative collaboration lesson plans (Nawi et al., 2015). State and federal standards require the alignment of these tasks.

Ingram et al. (2004) reported special education teachers' high stressors and responsibilities are policies, data, and paperwork. Accountability has become an extreme stressor for the classroom educator. A significant challenge for teachers was understanding the use of extant technology to measure data (Ingram et al., 2004). The Institute for Educational Science Center for Education Statistics (2010) submitted a data usage report containing the following information:

- Ninety-seven percent of teachers have remote access to school e-mail, and of these teachers, 85 % used the access sometimes or often. Eighty-one percent of teachers had remote access to student data, and of these teachers, 61 % used the access sometimes or often.
- Teachers sometimes or often used the following for instructional or administrative purposes: word processing software (96 %), spreadsheets and graphing programs (61 %), software for managing student records (80 %), software for making presentations (63 %), and the Internet (94 %).

The percentages of teachers in low and high poverty schools differed based on the tasks they often completed. They are as follows: used e-mail or list-serve to send out group updates or information to parents (69 % compared to 39 %) or students (30 % compared to 17 %), used e-mail to address concerns with parents (92 % compared to 48 %) and with students (38 % compared to 19 %), used a teacher web page to correspond with parents (47 % compared to 30 %) or with students (36 % compared to 18 %) (Institute for Educational Sciences for Education Statistics (IES), 2010).

The researchers sought to determine if in-service and preservice teachers would use a software platform to complete a required task, such as creating and sharing, using a software platform to achieve a required task. Certain grade-level teachers were more likely to collaborate than others. The frequency of their usage of the software platform was not a quality indicator for lesson plans.

Educational Data Systems

Reducing the paperwork burden on special educators and increasing individual time with students while helping districts meet complex federal and state compliance regulations, the operational special education data management systems can aid school districts in making special education processes more efficient. This system can reduce the paperwork burden on special educators and increase their time with students while helping districts meet complex federal and state compliance regulations. The data systems can include compliance and event alerts with adjustable parameters to help schools agree with the Individuals with Disabilities Education Act requirements and timelines.

Efficient systems also feature secure, virtual file cabinets of each student's special education-related documents such as Individualized Education Programs or "individual education plans." These systems ensure comprehensive and accurate record-keeping and allow central office personnel to create state reports from data stored in the system, reducing duplicate data entry (Meller et al., 2012).

The newer systems are often web-based, allowing provider, teacher, and administrative access. Because the systems eliminate the time needed for sorting paper files or retyping or even handwriting information, special education teachers are better able to concentrate their efforts on implementing instructional best practices and planning new or renewed lessons for students (Meller et al., 2012). Also, the potential exists for the use of software to correlate general education requirements working with Response to Intervention (RTI) and special education inclusionary students.

RTI is a multitier approach to the early identification and support of students who have learning, and behavior needs. The process begins with high-quality instruction and universal screening of all children in the general education classrooms. Learner interventions are at increasing levels of intensity to increase their rate of learning. Individual student responses to instruction provide a base for decisions about the power of educational interventions and duration. The RTI design offers a design in making decisions in both general education and special education. The RTI system helps create a plan of instruction and intervention guided by child outcome data (RtlNetwork.org, 2016).

School personnel must meet procedural requirements by completing professional paperwork for the federal, state, or local special education law or regulations as required by the Individuals with Disabilities Education Act. Some of the documents are individual education plans, behavioral plans, manifestation determination review materials, annual goals and objectives, and student re-evaluation forms (Meller et al., 2012).

Software developers with platforms that collect data for educators need to question and observe the educator's needs. No controlled studies exist that examine student data software through the eyes of educators and how educator use affects student outcomes (Wayman et al., 2004).

New ways improve strategies and outcomes for those students with disabilities by focusing on the technology and ability to collect data on general education teachers. A preponderance of the evidence shows that classroom teachers are the single most important influence on student achievement. How general education teachers receive preparation to work with students with disabilities has been overlooked in brief, it urges investment in the preparation of general educators is key to improving outcomes for students

In a report about the application development environment for educational data collection systems, researchers concluded that through an accretion of best practices research to identify likely success factors, information technology (IT) implementation projects are rarely successful. Across industry sectors, at least 40% of such generic IT projects either are abandoned or fail to meet business requirements, while fewer than 40% of large systems

purchased from vendors meet their goals (Kaplan & Harris-Salamone, 2009). Several research accounts noted an unsuccessful rate of 70%. However, from additional collaborative efforts of IT, other rates were one in eight enterprises was found to yield positive results as productive.

Unfortunately, at least half of financial statements with charts did not produce agreed results. Hence, in 2006 a document compiled by the Report from the Standish Group found 35% of IT efforts were reaching proposed guidelines, timely results, and on budget. In summary, this research account noted that this yielded

Successful Data-Gathering Tools

A selection of development tools for collaboration is an essential factor in successfully creating, testing, deploying, and adopting an application. Further, as most applications are challenging to change post-deployment, the application can age rapidly. Many benefits can be lost, as the application no longer meets the users' needs and educational institution.

Developing an application is time-consuming and expensive. Even so, tools exist on the market that can provide a school-sized user base (100 or fewer educators, administrators, and clinicians) with rapid development capabilities. These modern tools reduce development time, minimize security risks, and reduce "glitches" (Cleveland, 2016). In Table 1 are the Required Computing Core Technologies for such expandable data gathering software.

Table 1

Computer Core Technology

Communications Infrastructure	Hardware Devices	Operating System	Application	Access and Security
Open Systems Interconnection Model (OSI Model) Standardized communication "language" Communication Mediums (i.e., Fiber Optics, Ethernet, Wi-Fi)	Computers, tablets, phones, and personal digital assistants	iOS macOS Windows Android	Data storage Relational Architecture Logic Controls User interface (UI)	Transport encryption User Privilege Sets User Credentials Operationalization of security policies and procedures (Cleveland, 2016)

Notes: Abbreviations UI user interface.

The following are specific requirements of a successful data gathering software tool used by educators and can include 100 educators or 100,000:

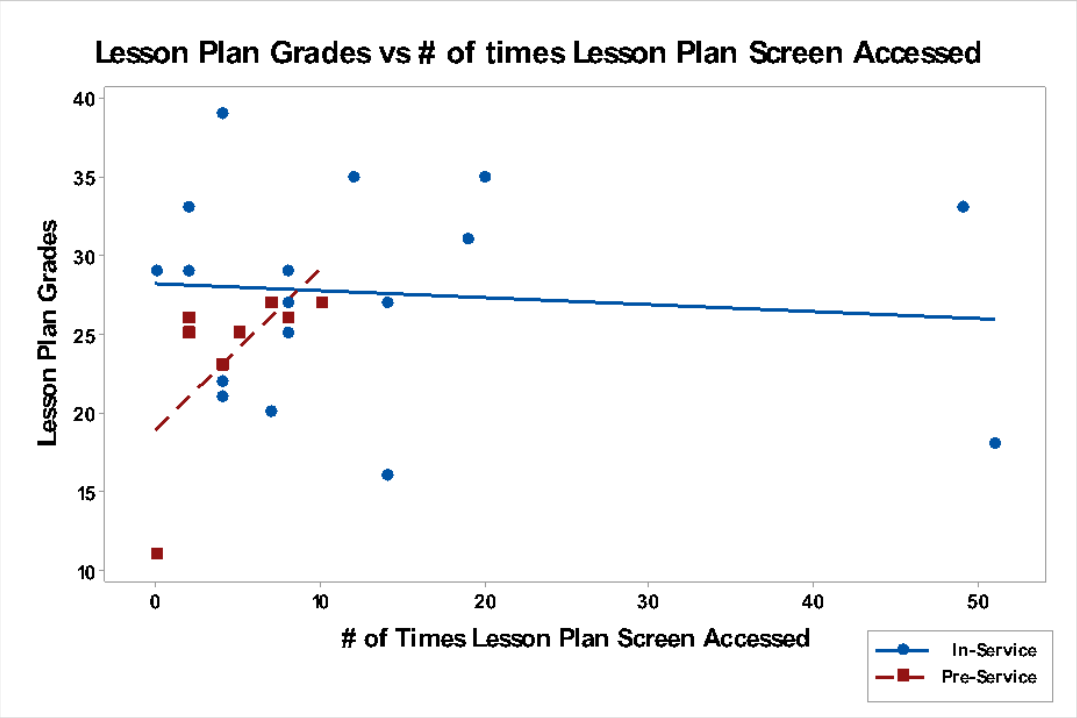
- Compile data, which is actionable by teachers based on an increased awareness of individuated student requirements.
- Enter individualized student goals or select from multiple professionally written goals.
- Generate automated charts to attain a clear understanding of unfulfilled student goals to implement appropriate and detailed interventions immediately.
- Record daily notes, photographic/video details
- Produce comprehensive reports for parents and government entities with easy-to-read graphs designed to indicate accurate tracking and trending of student academics, behaviors, and socio-emotional interactions.
- Optimize educational and behavioral techniques, resulting in measurable academic, behavioral, and socio-emotional improvements (Cleveland, 2016).

Administration and government entities require and mandate data collection by general and special education in-service and preservice teachers, who become frustrated by the required amount of data collection. One requirement is lesson plans. This pilot study used a technology-based self-monitoring platform and post surveys to compare preservice and in-service teachers' frequent use, quality, and collaboration in developing lesson plans.

Methods

A convenience sampling included (n = 18) general and special educators with 56% participation, in-service teachers in a rural K-6 school district in South Mississippi, and (n = 8) with 66% participation of preservice teachers, students at The University of Southern Mississippi in Hattiesburg, MS, United States. The researchers graded the lesson plans submitted by 18 in-service and eight preservice teachers. They graded the plans on a scale of 1–4 for 11 subscales using Lesson Pan Rubric (see Appendix A) metrics approved by MAET for the 2017–18 school year. The subscale scores were then totaled. Total scores ranged from 11 to 39 points out of the 44 possible. *t*-tests compared the mean lesson plan grades. The mean scores were similar (=0.14) for in-service and preservice teachers [In-service: mean = 27.7 (SD = 6.3); Preservice: mean = 23.8 (SD = 5.3).

In-service teachers who taught Kindergarten through 3rd grade scored significantly higher than those who taught Grades 4 to 6 [$p < .01$, (Grades K-3: n = 12, mean = 30.9, SD = 4.4), (Grades 4–6: n = 6, mean = 21.2, SD = 4.2).



Software recorded date/time of option selection when using the software. In-service and pre-service teachers were accessed using Wilcoxon two-sample tests by comparing the number of times software options. The teachers logged into the software between 1 and 29 times, with the median # of logins = 4. Teachers selected the "Go to Lesson Plan" option between 0 and 53 times, with the median # times = 3. Approximately 20% of the teachers never selected the "Go to Lesson Plan" option. There was no correlation between the number of times participants chose this option and the teacher's grade on the lesson plans for in-service teachers (p = .84). In contrast, there was a significant correlation between the teacher's grade and the number of times the option was selected (p = .03, r = .74).

Results

Total scores for in-service (N-18) and preservice teachers (= 8) ranged from 11 to 39 points out of the 44 possible. *t*-tests compared the mean lesson plan grades. The mean scores were similar (=0.14) for in-service and preservice teachers [In-service: mean = 27.7 (SD = 6.3); Pre-service: mean = 23.8 (SD = 5.3).] In-service teachers who taught Kindergarten through 3rd grade scored significantly higher than those who taught Grades 4 to 6 [p < .01, (Grades K-3: n = 12, mean = 30.9, SD = 4.4), (Grades 4–6: n = 6, mean = 21.2, SD = 4.2).]

No correlation existed between the number of times educators selected this option and the teacher's grade on the lesson plans for in-service teachers (p =.84). In contrast, among preservice teachers, there was a significant correlation between the teacher's grade and the number of times the option was selected (p = .03, r = .74)

Limitations

This pilot study provided a foundation for data management using an informatics tool with in-service and preservice teachers. The small sample size (n = 26) made it difficult to find statistically significant relationships from the available data. The data gathering tool used in this study was an innovative data gathering system that implemented portable data gathering on an iPod touch. Only a few prior research studies were available. Because of the nature of the portion of the pilot that took place in a public-school educational setting, time restraints limited researchers to a 2-hr training session with the teachers.

Although the study provides foundational findings, the main limitations are as follows: the school technology department director, who, because of his workload, was intermittently available. Additional delays in troubleshooting were the phone connection that continued to cause technological issues. School computers were outdated and contained numerous school firewall systems that had not been removed and interfered with lesson plans to access and software functions. It also delayed in-service teachers from accessing and implementing their use of the informatics tool.

Experimental mortality occurs in the public schools with teachers dropping out of, or never fully participating in, the study on a non-random basis. One school semester and only the spring semester limited access to in-service teachers. Starting and training the in-service teachers in the first semester of the fiscal school year and submission in the second semester would have provided them with an acclimation time. The school's administration of state testing materials limited teachers' data gathering and participation time of lesson plans and implementation. The preservice teachers were in their first year and had limited pedagogy and technology skills.

Summary

Most in-service and preservice teachers will use a software platform for completing a required task when given the opportunity. Certain grade-level teachers were more likely to collaborate than others. The frequency of their usage of the software platform was not a quality indicator for lesson plans. Providing teachers with a tool that collects, collaborates, and assesses offers them time for teaching students, evaluating tasks, and sharing with colleagues.

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Appendix A

LESSON PLAN RUBRIC

	Unsatisfactory	Emerging	Target	Distinguished
Standards (CAEP 1.4)(InTASC 4) ☐ NA	Standards are missing.	Standards are provided and partially correlate to lesson objectives and tasks by reference number only.	Standards are provided (including reference member) and correlate with leaning objectives and tasks	Standards are provided (including reference number) and correlate with learning objectives and tasks; standards reflect integration of another subject area OR multiple parts of the standard are addressed in the objectives
Learning Objectives (CAEP 11, 1.3; InTASC 2) ☐ NA	Student learning objectives provide a broad focus for instruction objectives are teacher centered.	Student learning objectives provide a clear focus for Instruction	Student learning objectives are clear, measurable, and specific to the standard(s) and include active (action) verbs that define what all students will do.	Student learning objectives are clear, measurable, and specific to the standard(s); objectives provide differentiation/accommodations/variability to meet needs of all students
Assessment (CAEP 1.2; InTASC 6) ☐ NA	Assessment partially measures objective(s)	The assessment strategy is teacher observation OR assessment inaccurately measures the objective s)	Formative and/or summative assessment has clear relationship to the lesson objective(s)	Formative and summative assessments are defined, showing clear relationship to all objectives addressed in the Lesson; includes how students will receive timely, effective, and descriptive feedback toward quality work based on assessment results

	Unsatisfactory	Emerging	Target	Distinguished
				include a high level of detail; provisions are made for early/late finishers
Procedure's Instructional Strategies (CAEP 1.1, 1.3, 1.4, 1.5; InTASC 2, 3, 4, 5, 8) r NA	Lesson is teacher centered and incorporates minimal student practice; content is conveyed using one modality	Lesson is more teacher centered than student centered offering few opportunities for guided and/or independent practice. Limited multi-sensory support is provided with some variety in teaching strategies	Lesson is student centered; multiple teaching strategies are included multi-sensory support is provided, individual and group work are present and provide adequate practice	In addition, strategies show creativity and/or originality; Lesson integrates multicultural OR interdisciplinary components; tasks provide extensive and/or highly creative practice and engage students in the processes of critical thinking and problem solving in meaningful contexts
Procedures: Closure (CAEP 1.1) r NA	Focus is on clean-up and/or transition to next activity	The learning objective is restated; homework assigned, if appropriate	Candidate revisits the purpose for the Lesson and ties to real-life. Lesson is summarized by candidate and refers to future learning; Student questions are provided (Candidate centered)	Students review the Lesson by summarizing and/or sharing what they learned; question responses allow students to express that they have achieved understanding of the Lesson's main concepts; candidate revisits the purpose for the Lesson, ties to real-life and/or future learning (Student centered)
Materials (!STE 2a) r NA	List of materials given limited attention in the lesson plan. No materials listed	List of materials is incomplete or inaccurate. Teacher created handouts and/or other reproduced	List of materials is provided and accurate for both teacher and students. All handouts, both teacher centered and those	Detailed list of materials is provided for both teacher and students. All handouts, both teachers created and those from other resources, are referenced in the procedures

	Unsatisfactory	Emerging	Target	Distinguished
		handouts are not attached to the lesson plan	reproduced from other resources, are attached to the lesson plan	and attached to the lesson plan and include active URL hyperlinks
Technology (!STE 2a)		2	3	4
NA	Candidate selects technology/media unrelated to lesson objective	Candidate selects technology and/or media for the Lesson	The candidate engages learners in content and skill development utilizing media and technology to meet learning objectives	The candidate engages learners supported by media and technology throughout the Lesson to promote student learning and creativity
Professional Writing		2	3	4
NA	Poor quality of professional writing is evidenced by more than 4 errors in clarity, spelling, usage &/or grammar; the required lesson plan template is used	Fair quality of writing is evidenced by 3 or 4 errors in clarity, spelling, usage &/or grammar; the required lesson plan template is used	Professional writing is evidenced by 1 or 2 errors in clarity, spelling, usage &/or grammar; the required lesson plan template is used	Professional attention to formal writing is evidenced by clarity in writing as well as absence of spelling, usage, and grammatical errors: the required format is followed
				Rubric Score
				Rubric Mean

88 possible points

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- Page Limit: None
- Margins: 1" on all sides
- Title of paper: Top of page Capitals, bold, centered,
- Author(s) Name: Centered under title of paper
- Format: Feature Manuscripts should follow the guidelines of fifth edition of the
- Publication Manual of the American Psychological Association (APA).
- Figures and Tables: All should be integrated in the typescript.
- Abstract: An abstract of not more than 150 words should accompany each submission.
- References: Insert all references cited in the paper submitted on a Reference
- Page

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