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Table of Contents

JAASEP Editorial Board of Reviewers

Educational Leaders' Perspectives on their Preparation, Practice, and Professional Development in Multi-Tiered Systems of Support

Jodi Drury, Michael P. Krezmien, Kristine A. Camacho, and Alicia Gonzales

Where is the Paraeducator Content in Introductory Special Education Textbooks?

Sarah N. Douglas, Denise J. Uitto, and Sophia D'Agostino,

Classroom Membership: What Does That Mean Exactly?

Katie Heath

Teaching Middle School Students with Disabilities to Solve Multi-Step Equations using the Hands-On Equations System

Thomas C. Hendrickson and Annemarie Horn

The Impact of a Community-University Partnership Program on Special Education Teacher Training in Autism Spectrum Disorder

Emily R. Shamash and Alyson M. Martin

The Practices of Teachers in the Development of Post-Secondary Skills in Students with Learning Disabilities

Sara Taylor

Using Social Stories to Decrease Negative Behaviors in Students with Autism and Other Disabilities

Vivian C. Williams

Using Technology-Based Interventions to Improve the Social-Communication Skills of Adolescents with Autism Spectrum Disorder (ASD)

Nicole Anthony and Cynthia Wooten

Association of Intellectual Risk Taking with Science Achievement of Gifted Students and Comparison of their Intellectual Risk Taking in Different Grades and Gender

Mustafa Serdar Köksal, Esra Açıkgül Fırat, and Gamze AKKAYA

Applying Empathy Curriculum to Enhance the Role of the Paraprofessional for Students with Multiple Disabilities

Christopher Russel and Soribel Genao

Teaching Children with SMA 1 to Expressively Communicate Using Augmentative and Alternative Communication Systems: Extending Functional Communication Teaching Using a Model of Verbal Behavior

Cheryl Ostryn

What School Psychologists Should Know About Multiple Sclerosis

Ashley N. Phillips and Denise E. Maricle

Increasing Independent Toileting in Children with Autism Spectrum Disorder and Other Developmental Disabilities: A Systematic Review

Vicky G. Spencer and Meghan Ello

Author Guidelines for Submission to JAASEP

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***Educational Leaders' Perspectives on their Preparation, Practice, and Professional
Development in Multi-Tiered Systems of Support***

**Jodi Drury, Ph.D.
Michael P. Krezmien, Ph.D.
University of Massachusetts- Amherst**

**Kristine A. Camacho, Ph.D.
Worcester State University**

**Alicia Gonzales
University of Massachusetts- Amherst**

Abstract

Sixty-one educational leaders from a rural section of the Northeastern United States participated in this mixed-methods sequential explanatory study to determine the extent to which educational leaders felt knowledgeable and prepared to lead the implementation of multi-tiered systems of support (MTSS) in their schools. Despite educators' initial beliefs they felt knowledgeable about this topic, when probed for specific information on the components of MTSS gaps in knowledge and training were evident. This paper highlights these specific gaps in training and provides recommendations as to how educators and school district personnel can partner with higher education training programs to address this issue.

Keywords: multi-tiered systems of support, school leadership, knowledge of MTSS

***Educational Leaders' Perspectives on their Preparation, Practice, and Professional
Development in Multi-Tiered Systems of Support***

School leaders must meet the increasing demands of accountability placed on them to improve the outcomes of all students (Leithwood, Alma, & Hopkins, 2008). To do this, they must use assessment data to make responsive decisions, implement evidence-based programs to support students, monitor student progress, and provide instructional leadership to teachers to facilitate the delivery of these initiatives in the classroom (Lashley, 2007; Pazey & Cole, 2013). A significant gap exists between the knowledge and skills school leaders receive from their leadership training programs and professional development and current educational initiatives, policies, and the actual demands they face each day (Braun, Gable, & Kite, 2011; Bustamonte & Combs, 2011; Gumus 2015; McHatton, Boyer, Shaunessy, & Terry, 2010; Spanneut, Tobin, & Ayers, 2012; Vogel & Weiler, 2014). The result is many school leaders do not possess the knowledge and understanding of important initiatives in the field that can improve outcomes, especially the knowledge and skills needed to implement Multi-Tiered Systems of Support

(MTSS). Most states are moving towards strengthening their improvement efforts and increasing student achievement but do not have a clear, statewide plan to ensure this improvement. Additionally, they struggle to find the resources to implement MTSS. This paper examines school leaders' knowledge to implement MTSS in Massachusetts. While researchers and school reformers have embraced MTSS as a key strategy for supporting improved outcomes for students, it is less clear school leaders are being adequately trained and supported to create and sustain MTSS as part of their own professional development.

Multi-Tiered Systems of Support (MTSS)

Multi-Tiered Systems of Supports (MTSS) were first introduced into legislation under the reauthorization of Individuals with Disabilities Act (IDEA, 2004) through the incorporation of Positive Behavior Interventions and Supports (PBIS) into legislation (Sugai & Simonsen, 2012). MTSS was created when Response to Intervention (RTI) and School Wide Positive Behavior Interventions and Supports (SWPBIS) were interwoven. Response to Intervention (RTI), typically thought of through an academic lens, followed the 2004 reauthorization of the IDEA of 2004 (Brown-Chidsey & Bickford, 2016). This combined approach provided a responsive and comprehensive model to address barriers to student learning (Averill & Rinaldi, 2011; Horner & Halle, 2020). The model--based on a public health approach to intervention (Brown-Chidsey & Bickford, 2016)-- combines (1) high quality instruction for all students in the general education classroom, (2) small group interventions for students making slower progress, and (3) intensive individualized interventions for students requiring even more support. Most models include universal screening, a problem-solving method and integrated assessment and data collection at each tier (Horner & Halle, 2020; Leonard, Coyne, Oldham, Burns, & Gillis, 2019). In addition to the student level supports, MTSS systematically focuses on leadership, professional development (PD), and empowering school cultures to assess curriculum and instruction to improve the performance of all students (Leonard, Coyne, Oldham, Burns, & Gillis, 2019).

The state of Massachusetts issued guidance and resources for school district administrators and staff to utilize when implementing MTSS. The state recommended implementation of MTSS in 2015, consistent with the requirements of the Every Child Succeeds Act of 2015 (ESSA, 2015). The Massachusetts model proposed a framework for both academic and nonacademic supports focused on high quality core curriculum and instruction, universal screening and progress monitoring, research-based intervention and assessment practices, and collaboration between schools and families (Massachusetts Department of Elementary and Secondary Education, 2019).

Leadership Training Programs

One method through which leaders gain the knowledge and skills needed to implement key initiatives is through their educator preparation programs. Leaders of MTSS must be prepared with knowledge about the barriers and facilitators of change that come along with implementing MTSS. Leaders must choose staff carefully, design appropriate training, provide on-going consultation and coaching, evaluate progress, provide support to staff, and provide appropriate systematic interventions. Leaders must understand MTSS thoroughly, and they must be able to establish relationships with staff that will create a community of professionals to address the systemic issues that arise with implementation of these initiatives (Brown-Chidsey & Bickford, 2016).

A problematic fact is many leadership training programs have not revised their program of studies to address these new initiatives (Briggs, Cheney, Davis, & Moll, 2013) despite research that highlights the importance of the alignment between key educational initiatives and preparation programs (Darling-Hammond et al., 2007; Vogel & Weiler, 2014). Research findings highlight the importance of balancing coursework focusing on theory with practical information that is applicable to the actual responsibilities leaders face on the jobsite (Braun et al., 2011; Edmonds et al., 2007). School leaders often report a disconnect between the training they receive in their training programs and what they believe is actually needed to accomplish their work (Eddy & Rao, 2009).

Ongoing Professional Development

Another way educational leaders gain knowledge is through ongoing professional development. Educational leaders report they gain more meaningful training through ongoing professional development efforts offered in their individual school districts than through the training that is offered to them in their university training programs (McHatton, et al., 2010). Spanneut and colleagues (2012) examined the critical features of professional development for school leaders. Although MTSS was not specifically addressed through this study, they reported initial professional development efforts should be focused on providing principals with best practice strategies and methods to assist them in achieving quality instruction and developing assessments that monitor student progress.

Knowledge and Leadership Needed for MTSS Implementation

Mellard and colleagues (Mellard, Prewett, & Deshlee, 2012) found principals who effectively implemented RTI were strong instructional leaders. Principals communicated with their staff and supported their staff to understand it and implement it. They provided their teachers with the necessary time needed to understand more fully RTI and its implementation (Mellard, Prewett, & Deshlee, 2012).

However, gaps in the knowledge needed to implement MTSS was apparent in research conducted by Bineham and colleagues (Bineham, Shelby, Pazey, & Yates, 2014) which showed participants were confused about what RTI is, how to implement it, and its usage. One in three respondents stated they did not receive professional development training in RTI. One third of the respondents were confused about who was responsible for RTI (Bineham, et al., 2014).

Dulaney and colleagues (Dulaney, Hallam, & Wall, 2013) demonstrated the need for clear state and district guidelines and training for leaders in MTSS. Research at the school district level revealed most superintendents did not understand the MTSS language since they did not have a state-wide focus on MTSS (Dulaney et al., 2013). All the superintendents believed capacity building is crucial to MTSS. Superintendents felt strongly that principals must be trained in using data (Dulaney et. al., 2013). Superintendents indicated the need for clear guidelines and training for leaders, in addition to leadership teams for capacity building. Professional development is needed that focuses on data based decision-making and problem solving.

Purpose of Study and Research Questions

The purpose of this study was to understand the perspectives of Massachusetts' school leaders regarding their knowledge of MTSS. Specifically, this study looks at whether school leaders

perceive themselves as knowledgeable and prepared to implement MTSS in their schools. The two research questions that drive this research study are:

1. What are school leaders' (specifically Principals, Vice/Assistant Principals, Deans of Students, Community Coordinators, Special Education Directors, and Head Teachers) in rural counties of Massachusetts current knowledge of MTSS implementation?
2. What experience do these school leaders have with implementing MTSS?

Method

Research Design

A mixed-methods sequential explanatory (MMSE) research design was utilized in this research study. In phase one, quantitative data was collected and analyzed following by qualitative data in phases two and three. Quantitative data was collected through a closed-ended survey while qualitative data was collected through an open-ended survey and two recorded focus groups. A monetary incentive was provided for participation in the original survey. Additional monetary incentives were used for the open-ended survey and for focus group participation. Prior to any research activities, we obtained approval for this research study from our Institutional Review Board.

Study Population and Study Locales

Counties. Participants were selected from all rural districts and town school districts in three counties in Massachusetts. This region was chosen because it was comprised of a large number of rural and town schools with a large population of educators and students with sufficient similarities that result in a relatively homogenous setting and sample. The region was comprised of 50 independent school districts.

Sample population. There were approximately 155 educational leaders in the three districts. For the purposes of this study, the term educational leader means a school building administrator and included principals, assistant principals, deans of students, community coordinators, special education directors, and education team leaders. We selected educational leaders because members of each of these categories were responsible for developing, implementing, and/or monitoring MTSS interventions in their schools (Averill & Rinaldi, 2011).

Participant selection. The 155 Educational leaders from three counties were the sample frame; the people that had a chance to be included amongst all of those selected made up the sample frame. For the purpose of this study, the sample frame for the Phase 1 Survey Component were all school-based leaders in the region. The sample for Phase 2: Questionnaire and Focus Groups were the participants from the Survey portion of the study. All participants in the survey were invited to participate in the Phase 2 activities. The invitation was initially included as part of the survey. If participants were interested in participating in Phase 2, they submitted an email address to be contacted by the first author.

Participants. Table 1 displays the demographic data for the participants. In the category Type of School, the *n* and total percentage exceeds the total number of participants and 100 percent as

the leaders worked in multiple schools. The sample was comprised of 61 administrators (39.45 response rate) in public-school districts in the region. Most of the participants worked in elementary schools, were white, female, and were between 40 and 59 years old with a mean age of 49.4 years old. Most leaders had their master's degree, their administrative license, and were principals in schools. The participants worked in schools for ten to twenty-nine years. Participants in Phase 1 included 61 educational leaders. Participants in Phase 2 included 42 of the original 61 educational leaders. Six leaders participated in the focus groups.

Table 1

Demographic Information of Participants

Category	#	%
Type of School		
Elementary School	35	57%
Middle School	19	31%
High School	29	48%
Alternative School	5	8%
Segregated School	4	7%
Race		
White	59	96.7%
Black / African American	1	1.6%
Hispanic / Latino	1	1.6%
Gender		
Male	27	44%
Female	34	56%
Highest Degree Earned		
Bachelors	1	2%
Masters	42	69%
Certificate of Advanced Graduate Studies	13	21%
Education Specialist	1	2%
Ed.D./Ph.D.	4	7%
Position		
Principal	22	36%
Vice Principal	9	15%
Dean of Students	7	11%
Teacher Leader	4	7%
Special Education Director	14	23%
Other	4	7%
Posses School Administrator License		
Yes	52	85%
No	9	15%

Survey administration. We used individual district and school websites to locate the email addresses and phone numbers of each of the three counties' principals, vice principals, special education directors, deans of students, and/or other school-based leaders. Each potential participant was emailed the self-administered survey via Survey Monkey. Follow-up emails were made to leaders who had not responded after two weeks to ask them to complete the survey. A second email reminder was made after an additional two weeks.

Phase One: Survey

Phase one of the proposed study involved the administration of a survey about MTSS. The survey was administered to all school leaders from the participant population who returned a consent form.

Survey Instrument. The survey was electronically administered via an online survey platform. The items were developed through a systematic process including a review of items released for three validated studies on MTSS that used surveys (Hoover, Baca, Wexler-Love, & Saenz, 2008; Schwierjohn, 2011; Wakeman, Browder, Flowers, & Ahlgrim-Delzell, 2006). We collected all items across the surveys and entered these items into a spreadsheet. We then identified items that were the same or similar, as well as identified item content that were associated with the research questions, but that were not in any of the surveys. We then created a list of content types for items to include in the survey, those that aligned with the research questions. We then developed a set of items that were based on the content of items from existing surveys and content aligned to our specific research goals. These were the items we used for our survey. We then created a set of items focused on the school leader demographics. We also created a section that solicited information about their training and current knowledge of RTI/MTSS using a binary yes or no format. We utilized a psychometrician to review each item to ensure that the items were measuring the intended knowledge. At the conclusion of the survey, participants were asked whether to participate in a follow up open-ended survey and a focus group.

Quantitative Analysis. Survey data was exported from Survey Monkey as an SPSS.sav file. First, we used Chronbach's Alpha (0.87) and established the survey had acceptable internal consistency, and measure of reliability. We analyzed the data descriptively to understand patterns and distribution of participant responses. We reviewed the means and distributions of each of the items to identify patterns of responses that would benefit from a follow-up question. We then developed additional open-ended items based on the responses from the survey items, to be used in Phase 2.

Phase Two: Qualitative Data

Open-ended questionnaire. After the survey was completed and analyzed, we then recruited participants to respond to open-ended survey items. We developed seven open-ended items that examined leaders' specific experiences with the specific components of MTSS. Item 1 asked participants to define MTSS. Item 2 asked participants to provide an example of how they used data collection in their school. Item 3 asked participants to provide an example of how they implemented tiered instruction in their school. Item 4 asked participants to provide an example of how they used data to inform their decision-making. Item 5 asked participants to provide an example of how they used research-based interventions. Item 6 asked participants to provide an example of how they used universal screening. Item 7 asked participants what they would like

more training in. The open-ended items were also administered using Survey Monkey, consistent with the procedures for the Phase 1 survey administration.

Open-ended question analyses. We used a modified form of content analysis to analyze the open-ended items. We analyzed the responses using descriptive interpretation, creating a rich description of the participants' perspectives for each question. The data were organized, categorized, instrumentally coded and re-coded, and condensed into major codes and minor codes. We combined the codes in themes and then interpreted those themes. This involved incorporating our own analytic ideas that shaped and refined thinking and provided insights for analysis. Finally, we examined the codes from each response and compared the content of the responses to researched definitions to understand how closely the respondents' views aligned with knowledge from the literature.

Focus groups. Each focus group was held in a comfortable room at a high school near the participants' work or home. Information from the close-ended and open-ended questionnaire was utilized to create the focus group questions. There were two focus groups consisting of six participants. The focus groups were used as a method of data collection that brought respondents together to discuss the data from the survey and to reflect and discuss their own understanding of MTSS. The focus groups provided a deeper understanding of leaders' knowledge and skills in MTSS. There were several primary questions that drove the focus group discussions: (1) What do you think about leaders reporting high knowledge but reporting mixed levels of formal training? (2) How are school leaders learning about MTSS? (3) Do some leaders not feel well prepared to lead universal screening, progress monitoring, and data analysis and decision-making? and (4) What training or support would they need to be well prepared? Then, the first author developed additional questions and queries based upon the discussion.

The focus groups were approximately one hour long and held in person with the first author serving as the moderator with a trained assistant moderator with training in special education. The notes contained quotes, key points/themes, follow-up questions that could be asked, and big ideas or thoughts the assistant moderator had. An audio recording was also created, and the tape was reviewed as part of the analysis. The moderator provided a clear topic, guidelines, ground rules, pre-determined questions, mild and unobtrusive control, clear introductions, clear conclusions, pauses, probes, and an established permissive environment for the focus groups. The moderator and assistant moderator debriefed and collaborated on feedback data analysis and feedback for the final report.

Focus group procedures. The focus groups followed procedures aligned with standard practice. The moderator presented each of the initial questions in a clear and precise manner. When a comment resulted in a new line of discussion, the moderator encouraged discussion on that topic. Both the moderator and assistant moderator developed additional written questions that the moderator reviewed and asked as appropriate. When a participant made an inconsistent or vague comment, the moderator probed for elucidation and explication. When a topic was completed, the moderator orally summarized the responses and discussion and checked for confirmation from all participants. If a participant had a different position, they were asked to share that

position, and the moderator summarized that correction for confirmation. The moderator did not begin the next question until all participants confirmed the summary. Upon completion of the focus group, the moderator and assistant moderator debriefed. Themes, interpretations, and ideas were written down in a debrief form.

Qualitative data analytic procedures were used to analyze the focus group items. The field notes were labeled and filed, including audiotapes and other materials. The moderator then prepared a summary of the focus group data using the original question guide as an organizational system. The data was analyzed through a modified content analysis process. The first author reviewed the data recursively. She documented specific terms and words used consistently by the participants. She considered the summaries and the terms in the context of the triggering stimuli and then developed interpretations of the data in those contexts. The tone and intensity of comments was also examined and used to help understand the comment more richly. One of the key aspects of the review process was to examine changes in perceptions by tracing participants' changes in opinion, or changes in position, after their interactions with others. The frequency of the topics discussed were analyzed to understand if these topics were more important or of special interest to participants. Special consideration was given to what was not said and what topics received little attention. Responses that were specific and based on experiences were given more weight than responses that were vague and impersonal. Finally, all data were reviewed again. Emerging themes were documented, and comments and quotes were added to help bring voice to the themes. The final report was shared for verification with other researchers, revised, and finalized.

Findings

Findings Research Question 1: School Leaders' Current Knowledge of MTSS

Survey items. All but three participants (95.1%) indicated MTSS was important to improving student outcomes (the other three did not complete the item). Table 2 displays the distribution of scores on the Likert items and the means and standard deviations for the closed ended items in the survey. Table 2 shows the majority of leaders stated they either strongly agreed or agreed they were knowledgeable about MTSS while just 11.5% indicated they did not feel knowledgeable about MTSS.

Table 2

Distributions of Scores and Mean of Scores on Survey Item

Abbreviated Item	SD	D	A	SA	Mean	Std. Dev.
I feel knowledgeable about MTSS	0	7	41	10	2.05	0.54
I have had adequate formal training on MTSS	4	20	25	9	1.67	0.82
My University courses provided me with information on MTSS	18	33	6	1	0.83	0.68
My Professional Development provided me with info on MTSS	3	15	32	8	1.78	0.75
I believe that my school is implementing MTSS effectively	1	22	30	5	1.67	0.66

I feel well prepared to implement MTSS at my school	0	21	30	7	1.76	0.66
I feel well prepared to lead data-based decision making	0	7	37	14	2.12	0.59
I feel well prepared to lead universal screening.	2	24	24	8	1.66	0.76
I feel well prepared to lead progress monitoring.	0	12	34	12	2.00	0.65
I feel well prepared to lead MTSS	1	15	29	13	1.93	
I feel well prepared to analyze data	0	6	36	16	2.17	0.60
Leaders must have expertise in MTSS to implement MTSS	0	8	34	16	2.14	0.63
Leaders must train staff in MTSS to implement MTSS	0	4	29	25	2.36	0.61
Leaders must create an MTSS leadership team	0	8	26	24	2.28	0.70
Leaders must communicate and reinforce the expectation for data-based decision-making	0	0	34	24	2.41	0.50
Leaders must schedule MTSS “Data Days” throughout the year	0	9	27	22	2.22	0.70
Leaders must provide MTSS intervention support to staff	0	0	31	27	2.47	0.50
Leaders must share outcomes with staff, students and parents	0	1	27	30	2.50	0.54
Leaders of successful MTSS create frequent opportunities to celebrate and communicate success	0	0	34	24	2.41	0.50

Open-ended responses about leaders’ knowledge of MTSS. Forty-two school leaders defined MTSS in an open-ended response. Twenty respondents named MTSS rather than providing a definition of the term. For example, most defined MTSS as “Massachusetts Tiered System of Support” or “Multi-Tiered System of Supports.” The majority (86%) of participants did not describe the main components that comprise the system of MTSS in their definitions. Three participants reported MTSS allowed for identification of student need, which was accurate but revealed a subtle lack of knowledge about the comprehensive nature of MTSS. Fifteen participants used the term “student needs”, and thirteen participants used “interventions or supports” in their responses. Identification of students needing support is an important aspect of MTSS, but failing to acknowledge the universal nature of supports associated with MTSS is a major deficit in the definitions. The reliance on supports and needs revealed only a basic knowledge of MTSS.

Eleven people used “tiered system” twelve times in their responses, but these responses were not supported with additional information. The responses lacked information that demonstrated a deeper understanding of the complex nature of MTSS. For example, one participant stated, “identify students not making progress in general education classes and then giving them

support.” On the other hand, six of the participants provided robust definitions that included specific information about tiered interventions. For example, one participant stated:

“MTSS (Multi-Tiered System of Support or Massachusetts Tiered System of Support) meets the needs of most students (80%) via regular classroom instruction, while 15% of the students need additional (tier 2) support for academics and/or behavior, and 5% need intensive (tier 3) support for academics and/or behavior. MTSS is the system through which those structures are created, student needs are identified, interventions are established and implemented, and student-level data is reviewed to move students in and out of tiers as necessary.”

This response demonstrated a deep understanding of MTSS as a system of academic and behavior supports for all students that comprehensively integrated assessment, support, and ongoing monitoring associated with the three tiers. Furthermore, this definition also correctly incorporated both academic and behavioral components, a central aspect of MTSS.

Only three other participants included “academic and behavior” in their responses, with four of these reporting specific language about PBIS. One participant stated:

“MTSS is cohesive and comprehensive in the goal of meeting the needs of all learners. MTSS addresses academic as well as the social, emotional, and behavioral development of children from early childhood to graduation. MTSS aligns resources and support for students receiving instruction and for teachers and other support staff who are delivering the instruction.”

However, not all four respondents demonstrated the same depth of knowledge. For example, one participant who reported the term “behavior” inaccurately described MTSS as being embedded within a PBIS framework rather than viewing PBIS as a component of the MTSS framework. While this misconception may appear trivial, it potentially represents a superficial understanding of MTSS as a system that integrates RTI and PBIS within school educational frameworks.

Essential components of the responses. We compared the responses to established definitions of MTSS from the literature. We used two definitions as comparisons. The first definition was “MTSS, often used as an overarching construct for PBIS and RTI, is a school-wide, three-tiered approach for providing academic, behavioral, and social supports to all students based on their needs and skills” (Ziomek-Daigle, Goodman-Scott, Cavin, & Donohue, 2016, page 221). The second is MTSS requires educators to “make data-based decisions using sound assessment practices, implement effective classroom instructional practices with integrity, and differentiate instruction for students at-risk of failure” (McMaster & Wagner, 2007, p 223). We compared the codes derived for each response from the content analysis to the elements of these two definitions. Just 9.5% of the respondents provided definitions that included the same elements of these two definitions. An analysis of the specific components of the definitions leaders mentioned most often included: MTSS (54.8%), tiers (35.7%), supports (45.2%), based on needs and skills (28.6%), instruction (19.0%), interventions (14.3%), and using data (14.3%). Just 9.5% included each of these items within a comprehensive definition.

Focus group responses about leaders' knowledge of MTSS. We also engaged six educational leaders in a discussion about their knowledge of MTSS during two focus groups. The focus group revealed school leaders lacked sufficient knowledge about MTSS. Our content analysis revealed several codes that underscored the leaders self-identified need for additional knowledge of MTSS: (1) lack of knowledge on MTSS implementation; (2) lack of training on MTSS; (3) leaders have to teach themselves about MTSS; (4) age factors related to training that impact knowledge of MTSS and skills to implement MTSS; and (5) leaders' perception issues with knowledge of MTSS. For example, Leader 1 stated, "People feel knowledgeable about the pyramid, but don't know how to design and implement it in schools and get everyone on board to make it happen". The leaders consistently identified their lack of knowledge was associated with a lack of adequate training. All of the leaders from both focus groups agreed, "formal training in MTSS does not exist." Leader 3 stated, "Training is not at the state level yet, so you have to seek out information and weave through it yourself". Leader 4 reflected on the findings of the survey, which revealed that 83.6% of the school leaders self-reported they were knowledgeable about MTSS. The leader stated, "the high knowledge might actually be a false positive due to leaders' perceptions". The leaders agreed that because school leaders were expected to be the school experts on MTSS, they consequently developed a sense of knowledge about MTSS that was not consistent with their actual knowledge.

Leaders described several potential explanations for the lack of knowledge on MTSS, and for the potential misconception about their own knowledge from the survey. First, school leaders reported they did not receive formal training in MTSS, so they taught themselves about MTSS from what they could find from the state's website and other relevant literature. Since there was no systematic training for leaders, each leader created their own version of MTSS specific to their schools and districts with their own versions of MTSS implementation plans or approaches. We reviewed a number of state resources. We did not find materials and training supports for school, but rather general guidelines for MTSS implementation. They identified the lack of training as a major problem that interfered with their knowledge of MTSS and their subsequent capacity to implement MTSS. A second explanation was associated with school leaders' ages, which was also associated with their own professional training. All of the focus group participants were middle-aged and questioned if their age impacted their knowledge of MTSS. They wanted to know if younger educational leaders received training in MTSS that did not exist when they were in graduate school or in licensure programs. Finally, focus group participants reported school leaders likely felt if they knew even one fact about MTSS, they had knowledge of MTSS sufficient to report "agree" or "strongly agree" on the survey item about MTSS knowledge. However, the focus group participants agreed that knowing what MTSS is was very different from knowing how to implement it. Furthermore, the focus group participants wanted to know how to implement MTSS but reported there was no training available to help them obtain this knowledge.

Research Question 2: Leaders' Experience Implementing MTSS

Table 2 displays the response information for the closed ended items. The majority of leaders (91%) reported their school or district was implementing RTI/MTSS. At the same time, just 40% reported they had primary responsibility for implementing RTI/MTSS in their schools or districts. Just 61% agreed or strongly agreed their school were implementing RTI/MTSS effectively, with a substantial number (39%) disagreeing or strongly disagreeing. Forty-two

leaders completed open-ended response questions on several major components of MTSS that were then discussed in the focus groups. These included (1) data collection, (2) data-based decision making, (3) tiered instruction (4) research-based interventions, and (5) universal screening.

Data collection. Leaders were asked to provide an example of how they used data collection in their school. Twenty participants used non-specific language when describing the data collection procedures in their schools. For example, one participant stated, “We collect daily points.” Twenty leaders used terms including “standardized assessments” and “curriculum-based measures”. For example, one participant stated, “benchmark assessments, progress monitoring, and scheduled formative assessments”. Similar to these responses, the majority of leaders simply named assessments they used but failed to provide examples of how they used data, consistent with the item description. Twenty leaders named data collection tools but failed to explain how they used the data they collected to support students or staff. Six leaders mentioned different content areas in their descriptions. For example, one participant stated, “The teachers do math, reading, and writing assessments on a regular basis.” While the addition of content areas improved the content of the response, the responses each lacked an explanation of how the data were used. Six participants included teams or meetings as part of their responses. For example, one participant stated, “through student referral sheet and SST meetings.” Again, the descriptions failed to identify how the collected data were being used.

Eight leaders provided more robust answers that demonstrated an understanding about the utilization of data for educational purposes. One school leader reported, “progress monitoring for reading to determine if interventions are required to promote growth.” Additionally, three leaders mentioned screening and / or benchmarks. For example, one participant stated,

“Data is collected (MCAS scores, AP scores, attendance, failure rates, etc.) but it is often used to set long-term goals in my school. Rarely is data collected and used in an immediate way to assess or remediate student learning.”

This leader explained how they used data and also expressed the challenge faced using the data in an active manner. Similarly, another school leader reported, “Universal screening and benchmark assessments are conducted throughout the year on a specific schedule and are cross-referenced with state testing and classroom assessments.” This response established how data were collected and used, but failed to establish a use of data for instructional purposes, consistent with MTSS.

In contrast, about a third (n=13) of the respondents reported review data and / or make decisions in their responses. For example, one participant stated, “To identify students’ instructional needs for support and enrichment.” These responses generally exemplified the responsive utility of curricular based and progress monitoring measures specific to the MTSS model. Each of these respondents reported how the data were used to directly and positively impact student outcomes. Similarly, another school leader reported, “We have a data committee that meets once a month and we have been looking at discipline data and how we can curb our suspension numbers.” While this use of data was more global in nature, it still represented the use of data to remedy a problem associated with student outcomes. In the area of academic performance, another school

leader reported, “All students complete NWEA progress monitoring-3 a year for reading and math. Data teams meet regularly to review progress and discuss appropriate interventions and grouping.” This response demonstrated a deep understanding of data use in an MTSS model, establishing a data collection tool, a set time line, progress monitoring procedures, interventions, and a demonstration that data should be used to make decisions about tiered instruction.

Essential components of the responses. We also evaluated the content of the responses by comparing the codes identified through our content analysis with the content of Terri Metcalf (2008) who identified five core components of effective data collection: (1) Gathering accurate and reliable data, (2) correctly interpreting and validating data, (3) using data to make meaningful instructional changes for students, (4) establishing and managing increasingly intensive tiers of support, and (5) evaluating the process at all tiers to ensure the system is working. None of the leaders provided a response that completely aligned to the definition. Just twenty leaders included the use of data to monitor progress. Seventeen leaders reported the use of data to determine baseline student academic performance, and twelve leaders reported the use of data to make meaningful instructional changes. Seven leaders reported the use of data for benchmark criteria. Four leaders reported the use of data to support student behavior or evaluate their instructional practices, and just two leaders reported the use of data to evaluate the success of their school curriculum.

Leaders’ knowledge of data collection. The focus groups revealed the leaders did not believe they had the knowledge necessary to implement data collection procedures as part of an MTSS initiative and even highlighted a disconnect between what administrators perceived they needed to know about MTSS data collection versus the knowledge that teachers needed. Determining what to do with the data and how to access it once it was collected was another theme that emerged as a problematic issue.

For example, one school leader stated, “Leaders and teachers get different training. [...] Leaders need training in data analysis, progress monitoring, and what it looks like in the field between teacher and student.” This response acknowledges school leaders believed they needed more training in what data collection looks like when teachers are obtaining data from students but highlights that school leaders often perceived they received different training on MTSS compared to the training teachers received. This is problematic because in order to implement MTSS effectively, school leaders need to be able to take the knowledge they have on MTSS and effectively pass this information along to the teachers in their buildings.

Further, school leaders also acknowledged difficulties with accessing the data and utilizing the data once they had it. One school leader stated:

We are having growth pains about using things. [...] There’s a lot of frustration in that learning curve about figuring out how to use it and what we are accessing to access the data once it’s uploaded, and that’s a lot of hurdles to get over before you get to the point of accessing what we are doing wrong.

This response highlights the importance of school leaders having a clear vision and knowledge as to how data will be used once it is collected. After all, data collection procedures are only going

to be effective if school leaders have a clear vision and the knowledge necessary to work with staff on accessing and using all data that is collected. If data are collected and not accessed, the basic structure of the MTSS system cannot operate.

Data-based decision-making. The school leaders also provided responses about the ways that they used data-based decision making in their schools. Eleven leaders used “provide supports for students” in their responses. For example, one leader stated, “Student enrichment and supports are assigned based upon assessment scores and academic progress through regular data review.” This response accurately described data should be used to make assessments and that supports would be assigned based on scores but fails to elaborate on the process of data-based decision making. Six leaders used “provide interventions”. One leader stated, “It identifies students who are not making adequate academic progress and is the springboard to developing an intervention plan.” This response was accurate because it showed how intervention plans are designed around student needs; however, it did not include student behavioral needs, only academic, which is limiting.

Ten leaders incorporated “instruction” into their responses. One leader stated data-based decision making could be used for, “Hiring needs, SEL programming, overall course and teacher schedule, faculty meetings, and topics.” Four leaders used “staff and student support”. One leader stated, “Data helps me know what to focus on with my staff and with the students I teach.” These responses highlight higher level thinking about data-based decision making as they incorporate how data should be used to make systemic change within an MTSS framework.

Only two leaders used “course offerings”. For example, one leader stated, “Course offerings because of student needs and academic support classes added based on student needs.” Another leader stated, “We use the data in collaboration meetings”, an incomplete representation of data-based decision-making. One leader stated, “Data teams meet 3 times per year to go over student data, form intervention groups according to data, and progress monitor between data catches”, a much more thorough, and in-depth response. Only one leader mentioned special education. The leader stated, “Students who are unable to make progress are considered eligible for special education through learning disability laws.” This response very broadly discussed the student identification process but did not overtly mention the relationship between special education and MTSS. One leader used content specific information in their response. This leader stated, “Our MCAS data has been flat, as well as our DIBELS data so our team revamped our literacy plan to address this data.” This response was a good example of data-based decision-making. Very few leaders provided responses that connected data-based decision-making with special education or courses they teach. The majority of leaders used data to make decisions about instruction, interventions, and supports for students.

Essential components of the responses. Another way we examined the quality of the responses was to compare the responses with definitions from the literature. The definition of data-based decision-making was: “A structured problem-solving process and integrated data-collection system, based on the RTI and PBIS approaches, is utilized at each tier of the model. The effectiveness of instruction at each tier is determined by collecting data about students’ progress in a recommended monitoring schedule. With its emphasis on evidence-based instruction and collaborative, iterative problem-solving, MTSS acknowledges that instruction and/or contextual

issues, not student inability, could be the reason why students are not learning” (Averill & Rinaldi, 2011, page 92).

Twenty-two leaders used data to make decisions about academic instruction. For example, one leader stated, “Grade Levels meet frequently to review data to drive where student instruction focus needs to be.” Nineteen leaders collected data about student progress on a monitoring schedule. For example, one leader stated, “We examine the results after each assessment period and determine intervention groupings at each grade level.” Fifteen leaders used a structured problem-solving process as part of their data-based decision-making. One leader stated, “Monthly data meetings at each grade level.” Fourteen leaders reported they have an integrated data collection system. For example, one leader stated, “Discipline data drives PBIS boosters.” Leaders used data to make decisions about instruction, progress monitoring, and solving problems, but twelve leaders gave incomplete responses and only two leaders emphasized using data to change instruction or support staff in ways that will positively impact students. More leaders emphasized a focus on students’ deficits rather than using data to improve instruction.

Of the 42 respondents, one leader reported he didn’t use data, and another leader said he didn’t have a good data collection system.

Focus group on knowledge of data-based decision making. The six school focus group leaders were also asked to expand on their responses regarding data-based decision making. Overall, school leaders felt as though one of their major responsibilities was taking the data and interpreting the data themselves. For example, this leader stated, “Taking that data and interpreting it and then presenting it to staff and then it’s selling it too. You gotta see it and get buy in.” This comment highlights many of the difficulties leaders experience with their knowledge of MTSS data-based decision making. First, it highlights the importance that not everyone agrees with the notion that data can effectively lead to student supports. It also highlights that leaders believe they must universally have the knowledge and skills to interpret data for their staff. In order for MTSS to be successful, school leaders must be able to successfully work with their staff to interpret their own data as part of a data team while also working with school staff to understand that data, rather than teacher perception of student need, will lead to better supports for all students.

Tiered interventions. The 42 school leaders were asked how they use tiered interventions at their school, another central aspect of MTSS. Seventeen leaders mentioned specific and non-specific academic and behavior supports in their responses to the item. Thirteen leaders reported tiered instruction was based on data and monitoring. For example, one leader stated, “Our tiered system of instruction occurs within math and ELA curriculum. Students are monitored throughout the year and based on performance and teacher input, are placed or re-placed within a three-tiered setting.” The response indicates the use of the term “tiered instruction” but doesn’t provide any detail associated with how the instruction is tiered. Consistent with those responses, eighteen leaders reported the term tiers in their responses, but failed to provide a robust explanation of how the tiered system of instruction operates within their school. For example, one participant stated, “Tier 1- classroom, Tier 2 Title-1 (during scheduled intervention blocks), and Tier 3 SPED (during same scheduled intervention blocks).” This response demonstrated the leader understood the difference between level of need, but mistakenly associated tiers with

types of programs. For example, tier two services are generally implemented within the general education classroom as additional supports for students with specific needs. This school leader reported the tiers were associated with Title 1 or Special Education programs, inconsistent with the appropriate use of tiered instruction within an inclusive school. In fact, most of the responses including the term tier erroneously stated tier two supports must take place outside of the classroom. Other responses that described the tiers didn't include language about progress monitoring or data-based decision making, elements critical to a successful tiered intervention.

Seven leaders reported student needs in their responses. For example, one leader reported tiered intervention involved "meetings to review students' needs and determine appropriate classroom instruction and interventions or supports." The leader accurately reflected the importance of reviewing data to make decisions about instructional supports, but the response wasn't linked clearly to tiers or tiered interventions. Another leader acknowledged the challenges faced in implementing tiered instruction. This leader stated, "We know what to do, but we don't feel like we have the right tools or structures to do it yet." This type of response indicates MTSS is likely part of the day to day vernacular, but is likely not being implemented as intended.

Several school leaders focused on high needs students as the central purpose of tiered interventions. Two leaders focused on the use of tiered interventions for special education students, describing tiered instruction as a process of progress monitoring and providing additional support prior to special education referral. Another leader reported his school offered "SEL class with SPED teacher and Adjustment Counselor, for our most needy special education students. All day and any time support provided in identified space with Adjustment Counselor." These leaders did understand tiered interventions are important to students with special needs, including the use of a highly structured and supported environment for high needs learners. However, their responses did not indicate they understood that tiered instruction was part of the school-wide system of supports. Instead, it appears they viewed MTSS as an approach for identifying special education needs or only as a system of supports for those students with intensive needs.

Essential components of the responses. We also compared the responses with a definition from the literature: "Explicitly offer a multi-tiered approach: Interventions available to students are typically categorized into three tiers. Emphasis is placed on schoolwide, differentiated universal core instruction at Tier 1; Tiers 2 and 3 provide intensive and increasingly individualized interventions (Averil & Rinaldi, 2011, page 92). Out of the forty-two responses, twenty-seven participants included that they tiered instruction based on student readiness. Seventeen participants mentioned differentiating instruction. Only three participants stated they tiered instruction based on students' learning profiles. None of the leaders stated they tiered instruction based on students' interests.

Focus group on leaders' knowledge of tiered instruction. The six focus group leaders also provided information on their knowledge of tiered instruction and its use within their districts. One leader stated, "We have the pyramid model at the preschool level. We do quite a bit of PBIS. We are a PBIS district, and we are doing it all day long in every building. It's a district wide initiative in our district. It's not just a special education thing." This response highlights some important issues with MTSS tiered instruction. First, it acknowledges the district has a

commitment to PBIS but that the support to utilize tiered instruction to effectively place students into tiers is only in place at one level within the building and only for behavioral supports.

Research-based interventions. The participants also responded to the question, how do you use research-based interventions in your schools? Fourteen leaders mentioned specific intervention tools in their responses. Thirteen of these leaders named specific interventions or programs, similar to one leader who stated, “Our staff has training in Wilson, Foundations, and Orton-Gillingham”. However, there was little consistency in the remaining responses. The rest of the codes were associated with few responses. These included differentiation, instruction, content specific, track time and fidelity, PD, testing interventions progress monitoring, UDL, planning, and meetings. One leader mentioned using co-teaching classes to support all learners. This information suggests that while leaders may be able to name specific programs or components of effective research-based intervention implementation, there was a lack of knowledge as to how research-based interventions are used at the classroom level.

Essential components of the responses. We also compared the responses to a description of evidence-based which means (a) “they must have scientific research to support their implementation” (Kratochwill, Clements, & Kalymon, 2007, p 25), which can be “expected to facilitate the development of proficiency in students’ basic skills when implemented with appropriate fidelity” (Kovalski, 2007, p. 82). Ten responses demonstrated a lack of knowledge about research-based practices. One leader stated, “I don’t think I use research-based interventions in my classroom.” Twelve school leaders gave an example of a research-based intervention but did describe any of the components mentioned in the above definition. Sixteen leaders provided an academic example of a research-based intervention. For example, one leader stated, “This year we will be using Wilson Reading for our Tier 3 reading intervention.” While this response includes a description of the practice (Wilson) and who is expected to benefit (students identified at Tier 3) it fails to identify the setting, implementers, and the expected outcomes for the student participants.

Only six leaders gave a clear definition of the settings and implementers who used the practice. One leader stated, “Our reading specialist bases her instruction on Orton-Gillingham methods; our clinical team utilizes CBT-based techniques for intervention and support.” Only five leaders provided an explicit description of their research-based practice. One leader stated, “We use DIBELs as a pre-screener for Title 1 intervention.” Only three leaders mentioned a research-based behavior program, one leader mentioned a research-based social skills program, and one leader mentioned a research-based social-emotional learning program.

The fact that many of the respondents did not fully describe how to implement a research-based intervention is potentially problematic. In order for interventions to be effective, they must be implemented consistent with their development. If school leaders lack the knowledge to be able to explain how to implement research-based interventions in the classroom, it is possible that any attempt to implement these interventions is not being done with fidelity. This is problematic to the implementation of any MTSS system.

Focus group on leaders’ knowledge of research-based interventions. The six focus group participants also provided information on their knowledge of research-based interventions and

similarly to their open-ended responses, provided very limited information on their knowledge of research-based interventions. One leader responded:

As an administrator you are looking at it at a different level. If we are expected to teach the teachers, I want you to show me what it looks like. Show me the actual practical application in the classroom so I can do it. Let me see a model of this. Right now, we are making the instructional materials for our staff all by ourselves. It's so much work for us just to facilitate our school moving forward.

This response highlights that school leaders may not sufficiently understand how to implement research-based interventions in the classroom and appears to suggest further that school leaders may require additional knowledge about what a research-based intervention is.

Universal screening. Twenty-four leaders described specific tools and approaches they used for screening students. All 24 leaders named tools and approaches instead of how they used those tools to conduct universal screening. Most leaders mentioned tools like STAR, Fastbridge, depression screening, DIBELS, Reading Street, Go Math, AIMS WEB, benchmarking, and SBIRT, but did not describe the use of those tools. Seven leaders described specific content or skills. One leader stated, "This will be used this year at the middle school level to identify those at risk for reading difficulties." This response did not explain how the universal screening will be done. The response also did not describe a specific skill or tool. The remaining four major codes were guidance, progress monitoring, interviews, and instruction. One leader stated, "completed through the guidance department." Very few leaders were able to describe the process of universal screening. One leader stated, "They use universal screening for benchmark testing 3 times per year along with weekly and bi-weekly progress monitoring." This was a strong response because it demonstrated an understanding of universal screening and provided the frequency with which such screening would occur. It also acknowledged universal screening is not the end to the process but the beginning in which students who need additional support must continue to receive progress monitoring.

None of the responses mentioned universal screening of staff to support and improve their instructional skills and relationships with all students and staff. It is also important to note this open response item received many responses that did not align with the question. Responses from seventeen leaders revealed they did not understand the value of universal screening. One leader stated, "I don't think universal screening is applicable in our setting." Another leader stated, "I do not use universal screening." Two other leaders stated they did not know what universal screening was. This is problematic because universal screening forms the foundation of an effective MTSS framework. If leaders are not using universal screening or believe it is not needed in their setting, it is likely they are not meeting the needs of all students through this structure.

Essential components of the responses. Leaders responses were also compared to definitions found within the literature. A definition of universal screening is, "the first step in identifying who are at risk for learning difficulties. It is a mechanism for targeting students who struggle to learn when provided a scientific, evidence-based general education. Universal screening is typically conducted three times per year. Universal screening measures consist of brief

assessments focused on target skills that are highly predictive of future outcomes” (Hughes & Dexter, 2011, page 1).

Seventeen leaders mentioned academics in their responses about universal screening. For example, one leader stated, “This will be used this year at the middle school level to identify those at risk for reading difficulties.” Six people included how many times they do universal screening. One leader stated, “that is done in kindergarten and upon entry for all students” indicating their knowledge of universal screening was limited to that done for identifying students through the kindergarten screening process. Only four leaders mentioned universal screening for behavior and only one person mentioned universal screening for social skills.

These responses demonstrate none of the leaders were able to provide a comprehensive definition that discussed all components of universal screening. Without knowledge of a working definition of universal screening, it could be suggested that implementation of universal screening would be nearly impossible.

Focus group about leaders’ experiences with universal screening. During focus groups, one of the themes that emerged was the lack of systems in place to support a universal screening approach to MTSS. For examples, one school leader stated, “There is a lack of training on systems- what systems are and how they go together.” Without a structure in place to support systems level implementation of MTSS, it is impossible to implement this approach into a fully functioning system that universally supports the needs of all students. In the absence of this systems level support, it will be impossible to systematically address the unique needs of each student.

Further, another school leader stated “People pull parts out but do not have the bigger systems of MTSS in place.” This highlights the notion that many school leaders do not have systems in place to universally support all students. In pulling parts of the MTSS system out, supports may be put in place for some select groups of students but not all students who could benefit from the supports of MTSS are likely to receive the support that is needed without a systems level design. Further, utilizing only parts of the universal screening system could also be due, in part, to the lack of knowledge that leaders have about what universal screening entails.

Discussion

The findings from this study highlight some important issues school leaders face when implementing MTSS in their districts. Most importantly, while most school leaders reported feeling knowledgeable about MTSS through the initial survey that was completed as part of this study, when more detailed questions were asked about MTSS and the core components of the MTSS approach, the majority of school leaders were unable to correctly describe MTSS and its core features. This is important because if school leaders are unable to correctly demonstrate knowledge of MTSS, we cannot expect them to be able to successfully lead and implement this initiative in their districts. As new mandates emerge, we must be mindful of how educational leaders obtain the knowledge and skills needed to implement these new mandates.

While the majority of leaders in this study had been in the field for over ten years and already had obtained Master's degrees, it is important for university training programs to align their leadership curriculum with current trends and initiatives in the field to ensure new leaders entering the field have the knowledge and skills needed to implement the new initiatives that are emerging in the field, such as MTSS. As researchers have consistently found that there is a gap between the knowledge educators obtain from their training programs and the reality of what they are asked to do on a day-to-day basis (Braun, Gable, & Kite, 2011; Bustamonte & Combs, 2011; Darling-Hammond, et al., 2007; Eddy & Rao 2009; Edmonds et al., 2005; McHatton et al., 2010; Spanneut, Tobin, & Ayers, 2012; Vogel & Weiler, 2014), it is important for training programs to better align their curriculum to meet the practical demands of the job. This also provides a unique opportunity for training programs to partner with school districts to ensure leaders who have already completed their training have access to ongoing professional development regarding new initiatives. It could also be argued state departments of education also need to assist in providing this training to district leadership staff.

Limitations

It is important to consider limitations to the current research study. First, this study was limited to educational leaders in one geographic region and the majority of the leaders were from a relatively homogenous group. This potentially limits the generalizability of the findings to different regions and to school leaders with different characteristics. We also had a response rate below our target of 50%. This means our sample may not reflect the general characteristics of the sample population adequately. Additionally, the qualitative components of the survey included subsets of the participants of the original sample, as intended. However, it is possible the participants in Phase 2, particularly the focus group, may not have adequately reflected the original sample. Lastly, it is important to acknowledge potential bias that could have entered into survey results, particularly on open response items. We employed a number of strategies to limit bias, including continuous debriefs between the first and second authors. However, but there is always bias, and that bias may have affected the interpretation of the findings.

Directions for Future Research

This pilot study revealed some interesting and troubling gaps in school leader knowledge of MTSS. Future research should be conducted to confirm or amend these findings through a larger study or set of studies. We believe a survey that included a national sample would help the field to understand the current knowledge of MTSS nationally, and help to frame the problem in a more comprehensive context. Additionally, utilizing the MMSE design with a larger sample of school leaders from a larger geographical region or across states would enhance the generalizability of the findings. Future research studies may want to examine university training programs and the current structures that are in place to support new school leaders in their training and knowledge of MTSS. As most of the participants in this study already had Master's degrees, one of the questions that emerged from the leaders themselves was whether their gap in knowledge was due to when they received their university training. Future research aimed at studying the curriculum of university programs and knowledge obtained by more recent graduates could assist with a better understanding as to the direction the field is moving in.

Additionally, there is a lack of information available about how MTSS is actually being implemented in schools. To date, most of the research on MTSS has focused on surveys,

interviews, and focus groups to understanding leaders' perceptions of MTSS. More research is needed to understanding effective implementation strategies and supports so leaders can use this knowledge to implement MTSS within their own districts.

Conclusions

Knowledge about MTSS and the components of MTSS varied across the sample of school leaders. While most leaders positively rated their knowledgeable of MTSS, most lacked a deep knowledge about the specific components of MTSS and lacked an understanding of how to implement MTSS in their schools. This revealed a critical gap in leadership training with respect to MTSS and MTSS implementation. School leaders are responsible for implementing MTSS, but the leaders have not received the training and support necessary to implement the complex MTSS process and the associated assessment, progress monitoring, and respective adaptations to programming based on that progress monitoring. Without the proper training, school leaders are utilizing their knowledge and available tools to implement MTSS to the best of their ability. However, it is unclear how the implemented MTSS programs are aligned to the state blueprint for change (Massachusetts Department of Elementary & Secondary Education, 2019). In order to ensure that MTSS is appropriately implemented, leadership training programs and state departments of education must develop and implement robust training and professional development sequences that prepare school leaders to implement MTSS as proposed.

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About the Authors

Jodi Drury, Ph.D. is currently an educational leader in Western Massachusetts. She has spent the past 16 years working in special education in public schools, as a teacher, administrator, and professional speaker. Her research has focused on building systems of supports for staff and students in public schools as well as compassion training for staff. Jodi has successfully created therapeutic schools and programs for students with emotional disabilities that were based on MTSS systems, along with the utilization of therapeutic animals and the arts.

Michael Krezmien, Ph.D., is a professor of special education and the director of the Center for Youth Engagement. His work is focused on supporting marginalized and minoritized learners.

Kristine A. Camacho, Ph.D. is an assistant professor of school psychology at Worcester State University. Her research interests include school discipline and supports for students with emotional disabilities.

Alicia Gonzales is a doctoral candidate in Math, Science, and Learning Technologies at the University of Massachusetts.

Where is the Paraeducator Content in Introductory Special Education Textbooks?

Sarah N. Douglas, Ph.D.
Michigan State University

Denise J. Uitto, Ed.D. (retired faculty)
University of Akron Wayne College

Sophia D'Agostino, Ph.D.
Hope College

Abstract

Paraeducators have become an important member of educational teams for students with disabilities. Although paraeducator supervision is mandated in federal law, numerous studies have noted challenges with paraeducator supervision. High quality teacher preparation, including use of materials that provide paraeducator focused content, is one way to ensure appropriate supervision and training of paraeducators. As a first step in analyzing teacher preparation materials for paraeducator content and alignment with research recommendations, a systematic review of introductory special education textbooks was conducted. Findings indicate limited content within most introductory special education textbooks regarding recommended team roles, professional standards, and paraeducator content. Limitations, future research directions, and implications for practice are discussed.

Literature Review

Paraeducators are an important part of the educational team, especially because of the supports they provide to students with disabilities in general education settings (Council for Exceptional Children, 2015; Fisher & Pleasants, 2012). The increase in inclusive practices has, in part, resulted in more paraeducators supporting children with disabilities (Alquraini & Gut, 2012). In fact, the latest federal report indicates that there are more paraeducators employed in schools today than special education teachers (U.S. Department of Education, 2020). Regardless of the educational setting in which they work, paraeducators are school employees who provide instructional support to students under the direct supervision of a teacher (Every Student Succeeds Act, 2015). This may include implementing teacher-designed lessons, preparing and organizing materials, and maintaining a safe and supportive learning environment (Council for Exceptional Children, 2015). Despite limited research on the use of paraeducators to improve outcomes for students (Brock & Carter, 2013), schools utilize paraeducator supports in the provision of services for students with disabilities in inclusive and special education settings.

Paraeducator supervision is mandated by the Individuals with Disabilities Education Act (2004) which states that paraeducators should be “appropriately trained and supervised...to assist in the provision of special education.” However, pre-service teacher preparation for supervisory roles with paraeducators is lacking (Ashbaker & Morgan, 2012; Biggs et al., 2016; Sobeck et al., 2020), which results in educators entering the classroom ill-prepared to oversee paraeducators (Douglas et al., 2016). The need for pre-service education programs to prepare *special educators* to train and supervise paraeducators is continually stressed by professional organizations

(Council for Exceptional Children, 2015) and researchers (Ashbaker & Morgan, 2012; Irvin et al., 2017; Sobeck et al., 2020). Yet, with the increase in inclusive practices (Alquraini & Gut, 2012), the necessity for *general educator* preparation to oversee paraeducators has also emerged (Douglas et al., 2016). Furthermore, paraeducator supervision is a federal mandate and noted in ethical practice for both general and special educators (Council for Exceptional Children, 2015; Council of Chief State School Officers, 2013; Individuals with Disabilities Education Act, 2004). Therefore, teacher preparation programs for both *general* and *special educators* must include instruction in paraeducator supervision (Douglas et al., 2016) and roles related to paraeducators (Chopra et al., 2011).

Compounding the challenge to provide appropriate pre-service teacher preparation related to paraeducator supervisory roles is the limited time allocated to special education content within teacher preparation programs. In a study where education faculty members across the United States were surveyed to learn about pre-service teacher program content, it was found that content related to students with disabilities is limited and that the vast majority of general education programs require a single introductory course related to special education (Harvey et al., 2010). It comes as no surprise then, that more recent research has indicated a lack of paraeducator focused content in pre-service teacher curriculum (Sobeck et al., 2020). Furthermore, in-service general and special educators report a lack of expertise in the area of paraeducator supervision (Douglas et al., 2016; Irvin et al., 2017; Maggin et al., 2009), and a lack of clarity regarding paraeducator roles (Giangreco et al., 2001).

While support for supervisory responsibilities may be seen as part of an administrator's role in schools (Ashbaker & Morgan, 2006), teachers have reported limited support from administrators for their supervision responsibilities with paraeducators (Biggs et al., 2016; Douglas et al., 2016). The National Policy Board for Educational Administration (2015) outlined administrator roles relevant to teacher/paraeducator teams including: promoting collaboration, implementing professional learning opportunities for faculty and staff, and promoting instructional practice consistent with students' learning. These roles are supported in the research and help administrators assist teacher/paraeducator teams in their work with students with disabilities (Biggs et al., 2016; Douglas et al., 2016).

Purpose/Research Questions

It is evident that teachers are inadequately prepared to supervise paraeducators, but the reasons are only beginning to be understood. A lack of pre-service training related to paraeducator topics may occur because of a lack of (a) paraeducator expertise among higher education faculty (Gehrke & Cocchiarella, 2013; Sobeck et al., 2020); (b) policies related to teacher preparation for paraeducator supervision (Douglas et al., in press); and/or (c) paraeducator content in teacher education textbooks (Douglas et al., 2019). Even if policy does not support preparation for supervisory skills, or higher education faculty lack expertise in paraeducator topics, content within textbooks may provide pre-service teachers with important exposure to these topics. However, to date no analysis has been conducted to determine the paraeducator content present within introductory special education textbooks. Therefore, this study provides a systematic analysis of the paraeducator content within introductory special education textbooks, the textbooks used in the preparation of both pre-service *general* and *special educators*. Research questions addressed in this study included: (a) What paraeducator content is included in

introductory special education textbooks?; (b) How are paraeducator, teacher, and administrative roles defined (in relation to paraeducators) within these textbooks and do those roles align with research and best practice recommendations?; and (c) What references to paraeducators are made within the textbooks (i.e., CEC paraeducator standards, glossary, research/literature)?

Understanding the paraeducator content within introductory special education textbooks may assist teacher preparation programs in their selection of resources/textbooks to introduce general and special educators to their important role in supervising paraeducators.

Method

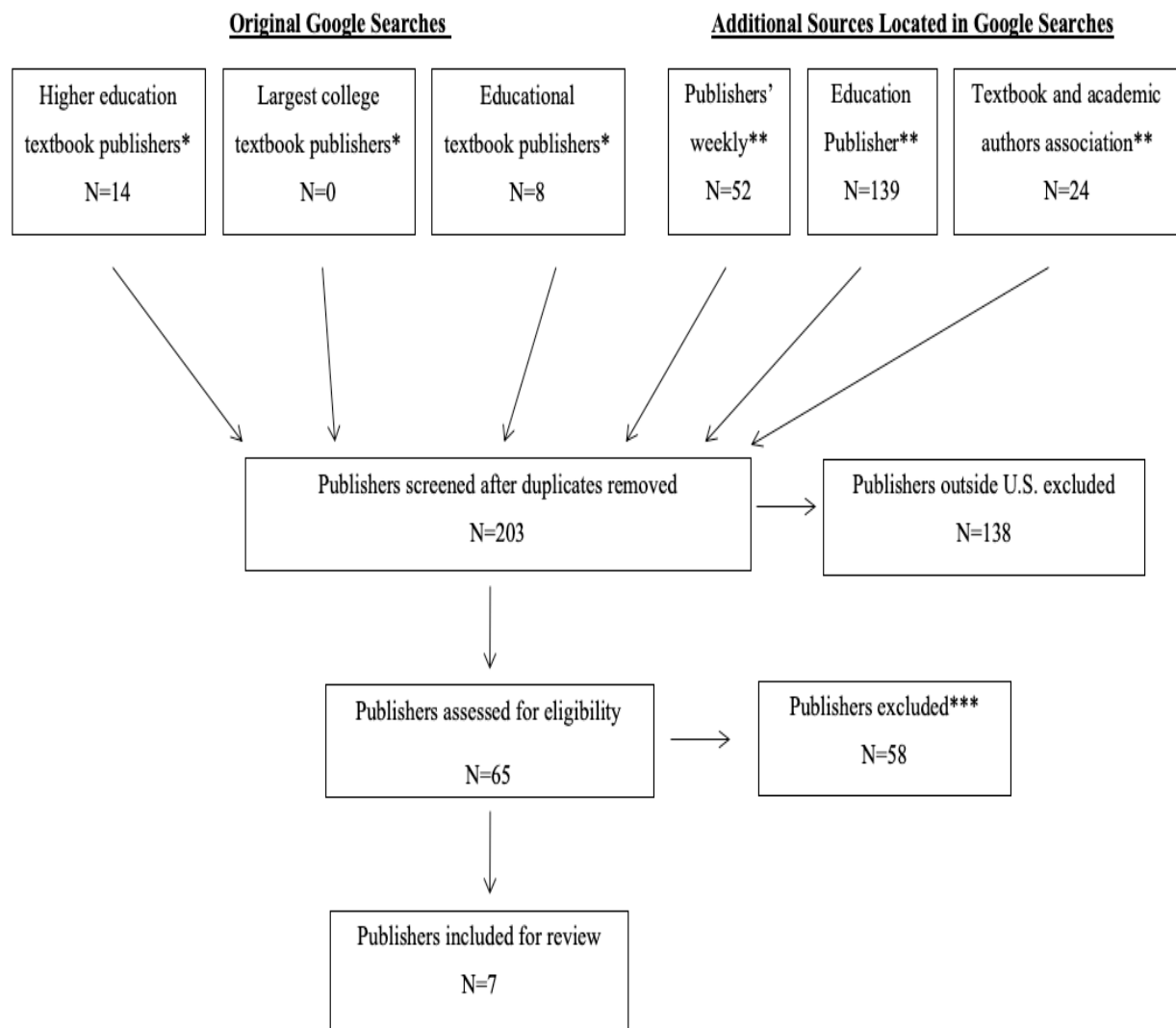
We followed the recommendations for conducting systematic reviews in educational research (Slavin, 1986), with adaptations to support the location of introductory special education textbooks. This included establishing inclusion criteria prior to publisher and textbook searches, an exhaustive and systematic search to locate publishers, and a search for textbooks from included publishers. This also included the development and testing of a rubric for coding textbooks, and a synthesis of findings and content within the textbooks.

Inclusion criteria

Textbook companies were identified by Google searches that were conducted independently by the first and second authors using the following terms: *higher education textbook publishers*, *largest college textbook publishers*, *educational textbook publishers*. Resources found through original google searches were also explored (i.e., publishers' weekly, education publisher, textbook and academic authors association; see Figure 1). Publishers were then assessed to determine if they met inclusion criteria including: (a) location within the United States – as there are differing preparation standards and utilization of paraeducators in other countries; (b) publication of textbooks for use in higher education; and (c) publication of introductory special education textbooks. Seven textbook publishers were identified that met all inclusion criteria (see Figure 1). Reliability of textbook company searches was 100%.

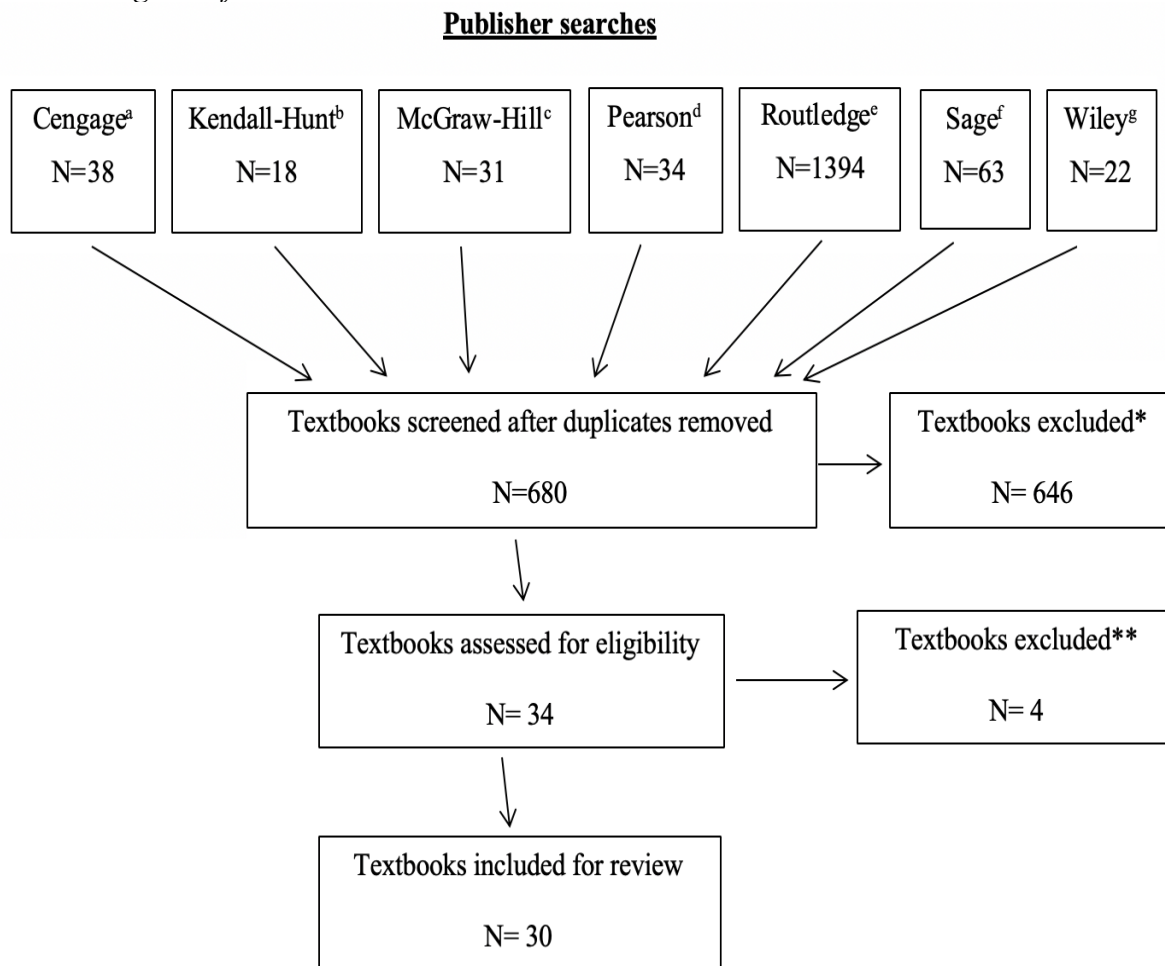
Next, a search of publisher websites was conducted using the terms *special education*, *inclusion/inclusive*, *exceptional*, and *special needs* to locate introductory special education textbooks. Search terms were selected based on language used by the Council for Exceptional Children (CEC; 2015). Textbooks were included if they were: (a) designed for an introductory special education course; (b) geared towards pre-service general or special educators kindergarten through high school; and (c) published between 2010 and 2019. Once textbooks were identified from our searches, descriptions for each textbook were reviewed to determine inclusion. Initial searches yielded 680 different textbooks. Textbooks were excluded if they were (a) older editions of included textbooks; (b) no longer published; (c) included a topic focus not applicable to introductory special education courses (e.g., focus on a specific disability category or instructional strategy); or (d) were not U.S. focused. The second author conducted the initial search which was replicated by the first author with 97% reliability. Thirty textbooks met inclusion criteria (see Figure 2 for textbook searches; see Table 1 for included textbooks).

Figure 1
PRISMA Diagram of Publisher Searches



Note. *Google search results only include individual publishing companies that came up in the search. **Original website searches also provided additional resources to locate publishers. ***Reasons for exclusion: non-textbook company, textbook company that did not publish introductory special education textbooks, textbooks not US focused.

Figure 2
PRISMA Diagram of Textbook Searches



Note. ^aIncluded Cengage, Wadsworth, and Brooks/Cole publishers, texts found at <http://www.cengage.com/us/>; ^btexts found at <https://he.kendallhunt.com/>; ^ctexts found at <http://www.mheducation.com/>; ^dtexts found at www.mypersonstore.com; ^etexts found at <https://www.routledge.com/>; ^ftexts found at <https://us.sagepub.com/en-us/nam/home>; ^gtexts found at <http://www.wiley.com/WileyCDA/>. *Reasons for exclusion: focus on child development, literacy, or reading; date prior to 2010, other disciplines (health, legal, business). **Reasons for exclusion: focus on specific instructional strategies/specific populations, behavior, case study approach, guides, article collections, program development, child development, childhood conditions, older editions of included textbooks, collaboration with families, no longer published.

Table 1

Textbooks Included in the Review (listed by publication date)

Text	Author(s), year	Title, edition	Publisher
1	Darragh, 2010	Introduction to Early Childhood Education: Equity and Inclusion	Pearson
2	Smith & Tyler, 2010	Introduction to Special Education: Making a Difference, 7e	Pearson
3	Rosenberg et al., 2011	Special Education for Today's Teachers: An Introduction, 2e	Pearson
4	Deiner, 2013	Inclusive Early Childhood Education: Development, Resources, and Practice, 6e	Cengage
5	Hunt & Marshall, 2013	Exceptional Children and Youth, 5e	Cengage
6	Hooper & Umansky, 2014	Young Children with Special Needs, 6e	Pearson
7	Allen & Cowdery, 2015	The Exceptional Child: Inclusion in Early Childhood Education, 8e	Cengage
8	Kirk et al., 2015	Educating Exceptional Children, 14e	Cengage
9	Arnett et al., 2016	Foundations of Special Education: Understanding Students with Exceptionalities	Kendall Hunt
10	Cook et al., 2016	Adapting Early Childhood Curricula for Children with Special Needs, 9e	Pearson
11	Salend, 2016	Creating Inclusive Classrooms: Effective, Differentiated Reflective Practices, 8e	Pearson
12	Turnbull et al., 2016	Exceptional Lives: Special Education in Today's Schools, 8e	Pearson
13	Bayat, 2017	Teaching Exceptional Children: Foundations and Best Practices in Inclusive Early Childhood Education Classrooms, 2e	Routledge
14	Colarusso et al., 2017	Special Education for All Teachers, 7e	Kendall Hunt
15	Gargiulo & Bouck, 2017	Special Education in Contemporary Society: An Introduction to Exceptionality, 6e	Sage
16	Gargiulo & Metcalf, 2017	Teaching in Today's Inclusive Classrooms: A Universal Design for Learning Approach, 3e	Cengage
17	Hardman et al., 2017	Human Exceptionality: School, Community, and Family, 12e	Cengage
18	Heward et al., 2017	Exceptional Children: An Introduction to Special Education, 11e	Pearson
19	Lewis et al., 2017	Teaching Students with Special Needs in General Education, 9e	Pearson
20	Robbins & Bucholz, 2018	Special Education: An Introduction for all Educators	Kendall Hunt

21	Friend, 2018	Special Education: Contemporary Perspectives for School Professionals, 5e	Pearson
22	Mastropieri & Scruggs, 2018	The Inclusive Classroom: Strategies for Effective Differentiated Instruction, 6e	Pearson
23	Smith et al., 2018	Introduction to Contemporary Special Education: New Horizons, 2e	Pearson
24	Vaughn et al., 2018	Teaching Students Who are Exceptional, Diverse, and At Risk in the General Education Classroom, 7e	Pearson
25	Bryant et al., 2019	Teaching Students with Special Needs in Inclusive Classrooms, 2e	Sage
26	Friend & Bursuck, 2019	Including Students with Special Needs: A Practical Guide for Classroom Teachers, 8e	Pearson
27	Gargiulo & Kilgo, 2019	An Introduction to Young Children with Special Needs: Birth through Age 8, 5e	Cengage
28	Hallahan et al., 2019	Exceptional Learners: An Introduction to Special Education, 14e	Pearson
29	O'Brien et al., 2019	<u>Teaching Students with Special Needs: A Guide for Future Educators 3e</u>	Kendall Hunt
30	Taylor et al., 2019	Exceptional Students: Preparing Teachers for the 21 st Century, 3e	McGraw-Hill

Rubric Development

A rubric was created for this study to evaluate the paraeducator content within textbooks (see Figure 3) and included three sections. The rubric included items to assess alignment with paraeducator research recommendations and federal regulations and determine inclusion of professional standards. The rubric was created using content from teacher, special education paraeducator, and administrator standards (Council for Exceptional Children, 2015; Council of Chief State School Officers, 2013; National Policy Board for Educational Administration, 2015). Literature related to paraeducator supervision was also considered during rubric creation. The first section of the rubric included information about the text and a list of search terms to locate paraeducator content. The next section focused on alignment with research/practice recommendations including teacher roles, paraeducator roles, and administrator roles. Roles were identified using professional standards (Council for Exceptional Children, 2015; Council of Chief State School Officers, 2013; National Policy Board for Educational Administration, 2015), relevant literature (i.e., Ashbaker & Morgan, 2012; Biggs et al., 2016; Chopra et al., 2011; Douglas et al., 2016; Fisher & Pleasants, 2012; Gerlach, 2015; Maggin et al., 2009), and federal laws (Every Student Succeeds Act, 2015; Individuals with Disabilities Education Act, 2004). The final section included a place to indicate references within textbooks.

Title, Edition, Copyright Date:	Author(s):	Publisher:
Overall Content Focus (e.g., general k-12, early childhood special education, inclusion):		
Search terms: <i>supervise, supervising, supervision, supervisor, collaborate, collaboration, aide(s), paraprofessional(s), paraeducator(s), assistant(s), evaluate, evaluation</i>		
Rating for team roles: 0 = No statements in textbook; 1 = 1 to 5 items from list based on statements in textbook; 2 = 6-10 items from list based on statements in textbook; 3 = 11-15 items from list based on statements in textbook		
Alignment with Research/Practice Recommendations		Rating
Textbook defines the roles, duties, and/or responsibilities of the teacher in reference to paraeducators (Teacher roles)		
Textbook defines the roles, duties, and/or responsibilities of the paraeducator (Paraeducator roles)		
Textbook defines the role of the administrator in supporting teacher/paraeducator teams (Administrator roles)		
Alignment with Research/Practice Recommendations		
Textbook includes content about the evaluation process for paraeducators		YES/NO
Textbook identifies the teacher as supervisor to paraeducator		YES/NO
References within the Textbook		
Textbook references the <i>CEC Paraeducators Common Core Guidelines (2015)</i>		YES/NO
Textbook provides website to the <i>CEC Paraeducators Common Core Guidelines (2015)</i>		YES/NO
Textbook includes terms in the glossary to reference paraeducator. List term(s) found:		YES/NO
Textbook includes terms in the subject index to reference paraeducator. List term(s) found:		YES/NO
Textbook gives references relevant to paraeducators within the text		YES/NO

Figure 3: *Textbook Rubric*

Teacher Roles: maintain effective communication with paraeducator; establish team roles/guidelines including supervision, overseeing, directing or guiding paraeducators; provide paraeducator orientation; prepare paraeducator work assignments; plan paraeducator instructional tasks; develop paraeducator schedules; delegate paraeducator responsibilities; observe paraeducator performance; provide feedback to paraeducator about performance including evaluation of daily work; provide on-the-job training to paraeducator; support paraeducator professional development; support paraeducator formal evaluation; share relevant information with administrators; set goals/develop plans for students with paraeducator; facilitate collaborative discussions and problem solving.

Paraeducator Roles: follow school policies, guidelines, procedures; engage in ethical practices; maintain effective communication and collaboration with team; maintain safe learning inclusive environment; implement student specific instructional assignments; complete clerical tasks; maintain student-oriented supports in environments; implement student plans from teacher; support students in health/personal care; supervise students; assist with student assessment; collect data on student progress; communicate with teacher about perceptions of student progress/needs; participate in training; incorporate feedback from teacher/administrator.

Administrator Roles: recruit, interview, and hire paraeducator(s); help to develop paraeducator job descriptions; support district/building level paraeducator orientations; develop paraeducator

related policies; develop/disseminate safety procedures; follow federal/state guidelines regarding paraeducators; support educational teams/promote teamwork; support problem resolution for teams; provide meeting times for teacher/paraeducator; support and facilitate ongoing paraeducator/supervisor training; monitor paraeducator training and state requirements; ensure teachers understand supervisory roles with paraeducator(s); obtain feedback from teachers about paraeducator performance; evaluate paraeducator(s)/supervising teacher(s); make paraeducators assignments.

The rubric was created in an iterative process in which the first and second author coded and recoded five textbooks not included in the review (i.e., textbooks that were no longer in publication). After each textbook was coded, coders met to compare ratings and revise the rubric to increase clarity and coding precision. After several revisions, the rubric was finalized and coding commenced using the final version for the rubric. Reliability was 100% for rubric validation and was conducted using point by point agreement and calculated taking the number of agreements divided by the total number of items in the rubric and multiplied by 100.

Coding of Introductory Special Education Textbooks

Coding of included textbooks was conducted by the second and third authors, using the rubric previously described. All coding was done independently. Coding training was completed using four outdated textbook editions not included in the review or during rubric development. Training continued until point by point agreement was at least 90% between coders then coding continued using included textbooks. Reliability was conducted using point by point agreement and calculated by taking the number of agreements divided by the total number of rubric items and multiplying by 100. Reliability for the rubric as a whole was 94%. Reliability in rubric sections included a mean of 87% (range = 60-100%) for *alignment with research/practice recommendations*, and a mean of 97% (range = 80-100%) for the *reference* section. Lower reliability occurred most frequently due to difficulty aligning textbook content with specific roles in the rubric. Any disagreements between coders were discussed until agreement was reached.

Results

The introductory special education textbooks included in this review had a general focus of special education, early childhood special education, or inclusive education in kindergarten to grade 12 settings. Results indicate that the majority of textbooks outlined roles for the paraeducator and teacher, defined the teacher as the supervisor, and included paraeducator specific references (see Table 2). However, few textbooks included content about the administrator's role, paraeducator evaluation, or included a reference to the paraeducator standards. Paraeducator content within introductory special education textbooks, and team roles of paraeducators, teachers, and administrators within texts are presented next.

Paraeducator Content within Introductory Special Education Textbooks

A variety of terms were used to refer to paraeducators within the textbooks including: paraeducator, paraprofessional, teaching/instructional assistant, teacher/classroom aide, intervener, health aide, one-on-one assistant, special education program aide, inclusion support aides, and shadow aide/paraprofessional. Content in textbooks included team roles for teachers, paraeducators, and administrators, specifically roles related to supervision and evaluation

(detailed in full next), and references to paraeducators in standards, glossary, subject terms, or literature references. Textbooks with significant paraeducator content are identified.

Team Roles

Team roles for teachers and paraeducators were noted in the majority of the textbooks, whereas administrator roles related to paraeducators was included infrequently (see Table 2).

Table 2

Features of Introductory Special Education Textbook

Text	Alignment with Research/Practice Recommendations					References within the Textbook				
	Teacher Roles	Paraeducator Roles	Administrator Roles	Paraeducator Evaluation	Teacher Supervisor Statement	Paraeducator Standards Referenced	Link to Paraeducator Standards Website	Glossary Reference	Subject Index	Paraeducator References
1	0	0	0	-	-	-	-	-	-	-
2	1	1	0	-	X	-	-	X	X	X
3	1	2	0	-	X	-	-	X	X	X
4	1	2	0	-	X	-	-	X	X	X
5	1	2	0	-	-	-	-	-	X	X
6	1	2	0	-	-	-	-	-	-	X
7	1	3	0	-	-	-	-	X	X	X
8	1	1	0	-	X*	-	-	-	X	X
9	0	0	0	-	-	-	-	-	-	X
10	3	3	1	X	X	-	-	X	X	X
11	2	2	0	-	X	-	-	-	X	X
12	1	2	0	-	X*	-	-	-	X	X
13	1	1	0	-	-	-	-	X	X	X
14	0	1	0	-	-	-	-	-	X	X
15	1	1	0	-	X*	-	-	-	-	X
16	2	2	0	-	X	X	-	X	X	X
17	1	1	0	-	X	-	-	-	-	X
18	2	2	0	-	X	-	-	X	-	-
19	1	2	0	-	-	-	-	-	X	-
20	1	0	0	-	-	-	-	-	-	-
21	3	3	1	X	X	-	-	X	X	X
22	2	2	0	-	X	-	-	-	X	X
23	1	1	0	-	X	-	-	X	X	-
24	2	2	1	-	X	X	-	X	X	X
25	3	3	1	X	X	-	-	X	X	X
26	2	3	1	-	X	-	-	X	X	X

27	1	1	0	-	X	-	-	-	-	X
28	0	2	0	-	-	-	-	-	-	-
29	0	1	0	-	-	-	-	-	-	-
30	1	2	1	X	X	-	-	-	X	X
Total with each feature				4	19	2	0	13	20	23

Note. X= included in textbook; - = not included in textbook; Rating: 0=no statements; 1=1-5 statements; 2=6-10 statements; 3=11-15 statements; *=statement of supervision only found in CEC teacher standards

Teacher roles. Although teacher roles related to paraeducators were noted in 25 of the 30 textbooks, the coverage was absent from 5 textbooks (i.e., rating of 0), minimal in 16 textbooks (i.e., rating of 1), and sufficient in 9 textbooks (i.e., rating of 2 or 3; see Table 2). Alignment within the textbooks of teacher roles with professional standards and recommendations in the literature was also minimal. For example, teacher supervision, guidance, or direction of paraeducators was only mentioned in 19 textbooks and in 3 of these textbooks the only reference to paraeducator supervision was found in the CEC standards within the textbook. The roles outlined for teachers (i.e., general and special education) within textbooks most frequently noted: (a) establishing team roles and guidelines including supervision and/or direction to paraeducators (20 textbooks); (b) facilitating collaborative discussions and problem solving within the teacher – paraeducator team (20 textbooks); (c) maintaining effective communication (14 textbooks); (d) and planning for paraeducators (13 textbooks). For example, textbook 25 provided content relevant to establishing team roles indicating that teachers and paraeducators work together to define their specific roles and responsibilities and “establish the authority of the teacher as supervisor and evaluator in the paraprofessional-teacher relationship” (Bryant et al., 2019, p. 90). Textbook 21 included content about the need for collaboration between the general and special education teacher in relation to paraeducators: “General and special educators need to collaborate in their work with and supervision of paraeducators” (Friend, 2018, p. 439). Teacher roles that were infrequently mentioned included: (a) sharing relevant information about paraeducator strengths and training needs with administrators (2 textbooks); (b) setting student goals/plans with paraeducators (2 textbooks); (c) observing paraeducator performance (3 textbooks); and (d) supporting paraeducator formal evaluations (3 textbooks).

Paraeducator roles. The majority of textbooks included paraeducator roles at least minimally. Sufficient detail about the paraeducator roles was provided in 18 of the textbooks (i.e., rating of 2 or 3), while 9 textbooks provided minimal mention of paraeducator roles (i.e., rating of 1), and 3 did not define paraeducator roles (i.e., rating of 0; textbooks 1, 9, and 20). A variety of paraeducator roles were discussed within the textbooks. The roles most frequently mentioned included: (a) maintaining student-oriented supports in environments (24 textbooks); (b) implementing student specific academic/instructional student support (23 textbooks); (c) supporting the health and personal care needs of students (19 textbooks); (d) maintaining safe learning and inclusive environments (19 textbooks); and (e) participating in training to develop knowledge/skills (16 textbooks). For example, textbook 3 highlighted how paraeducators can maintain student-oriented supports in classrooms through facilitating student involvement and inclusion in the statement: “Paraeducators do not serve to isolate students from their peers but instead use strategies and tactics as directed by the teacher to increase the students’ involvement

and inclusion” (Rosenberg et al., 2011; p. 334). Similarly, textbook 14 focused on paraeducator roles in supporting academic instruction with a statement that paraeducators “facilitate learning and access to the general education environment for students with disabilities” (Colaruso et al., 2017, p. 405). Other paraeducator roles mentioned with less frequency included: (a) following school policies/guidelines (2 textbooks); (b) communicating with teacher about perceptions of student progress (8 textbooks); and (c) assisting with student assessments under teacher direction (8 textbooks). The paraeducator role of incorporating feedback from teacher/administrator was not mentioned in any textbook.

Administrator roles. Only six textbooks mentioned administrator roles related to paraeducators (i.e., textbooks 10, 21, 24, 25, 26, and 30). In each case the amount of content was minimal. Content related to administrator roles included: (a) providing leadership to support the educational team and promote teamwork (5 textbooks); (b) resolving conflicts between team members (3 textbooks); (c) supporting ongoing paraeducator and supervisor training (2 textbooks); (d) evaluating paraeducators and their supervising teachers (2 textbooks); and (e) obtaining feedback about paraeducator performance (1 textbook). For example, textbook 30 included content related to the leadership role of administrators to support team collaboration with the statement: “The school administrator ensures that all parties involved have adequate time and resources to fulfill their collaborative roles. The administrator, as a school leader, should promote the sense of community that establishes the importance of collaboration, the parity among team members, and the shared responsibility for decision making and outcomes” (Taylor et al., 2019, p. 58). Textbook 10 included content related to administrator roles in resolving conflict: “Teachers who encounter paraprofessionals who refuse to accept the teacher’s responsibility and authority must consult with program administrators about how to resolve these challenges” (Cook et al., 2016, p. 347).

Reference to Paraeducators

Two textbooks referenced the CEC *Paraeducator Common Core Guidelines* (2015) (i.e., textbooks 16 and 24). Textbook 16 highlighted the use of these standards and emphasized the responsibility districts have to help paraeducators develop essential skills: “Guidance and direction for this crucial role is offered to teachers by the Council for Exceptional Children (2014), who identified a set of essential knowledge and skills that all paraprofessionals working with learners with exceptionalities should possess. Most paraprofessionals, however, will still require ongoing professional development and personalized support as the student population they work with changes” (Gargiulo & Metcalf, 2017, p. 166). Paraeducators were referenced in the glossary in 13 textbooks and included in the topic/subject index in 20 textbooks. Research and literature references relevant to paraeducators were cited within 23 textbooks.

Textbooks with Significant Paraeducator Content

Three textbooks stood out within this review because of the amount of content they contained related to paraeducators. Textbook 10 (Cook et al., 2016) focused on early childhood special education, textbook 21 (Friend, 2018) focused on general special education, and textbook 25 (Bryant et al., 2019) focused on inclusion. Each of these textbooks received ratings of 3 (i.e., inclusion of 11-15 statements) for paraeducator and teacher roles with paraeducator evaluation and teacher supervision of paraeducators mentioned in each text. However, these texts included minimal mention of administrator roles and did not reference the CEC paraeducator standards.

Discussion

The inclusion of students with disabilities in general education settings continues to increase with paraeducators providing important supports (Alquraini & Gut, 2012; Council for Exceptional Children, 2015; Fisher & Pleasants, 2012). As schools continue to employ larger numbers of paraeducators to provide supports to general and special education teachers and students with disabilities, an understanding of the roles for each team members is important. Critical for pre-service teachers, those for whom introductory special education textbooks are aimed, is their understanding of their role in relation to paraeducators, including their daily supervisory role to guide and direct paraeducators in their classrooms. Findings from this systematic textbook review noted coverage of teacher roles relevant to paraeducators found in 25 textbooks and paraeducator roles found in 27 introductory special education textbooks.

Interestingly, nine textbooks defined more roles for the paraeducator than the teacher and two textbooks had roles for the paraeducator without any roles mentioned for the teacher in relation to paraeducators. Federal reports indicate a 5.5% increase in the number of special education paraeducators and a decrease of 6.7% in the number of special education teachers between 2011-2016 (U.S. Department of Education, 2014; 2020), so the need for teachers to understand their roles in relation to paraeducators as well as paraeducator's roles is critical. The current demands placed on educators and paraeducators was recognized within some textbooks. For example, textbook 26 included the excerpt: "she stated that she needed someone to help her for at least a couple of hours each day. Peggy, another teacher, reminded her that with only two special education teachers and one paraprofessional available for everyone from kindergarten through fifth grade, she was asking for far too much, especially because these professionals also had other responsibilities" (Friend & Bursuck, 2019, p. 104).

In order to properly prepare teachers to understand their role and roles paraeducators provide, paraeducator content must be included in textbooks and coursework. Publishers, authors, teacher educators, and pre-service accreditation organizations must join together to ensure teachers are provided with appropriate paraeducator content within their pre-service training. Results from this review highlight gaps related to paraeducator content in introductory special education textbooks and confirm previous research indicating an overall lack of paraeducator content within textbooks used in pre-service teacher training programs (Sobeck et al., 2020). Recommendations are provided to address each of these gaps. Limitations, future research directions, and implications for practice are also discussed.

Recommended Changes to Textbooks

A variety of terms were used within textbooks to refer to paraeducators (e.g., classroom aide, paraprofessional), which may be useful given the range of settings in which teachers work and the variety of paraeducator roles that are often held within these settings. However, given the wide variety of terms used within textbooks, higher education instructors should ensure pre-service teachers understand the many titles that are used to represent paraeducators in educational settings. Furthermore, the varied titles within textbooks related to paraeducators highlights the numerous roles that paraeducators might fill within the classroom, all of which should be addressed in coursework and textbooks.

Although the textbooks included in this review contained content related to paraeducators several gaps were noted. First, many of the textbooks provided only minimal inclusion of teacher roles related to paraeducators (i.e., 21 textbooks with a rating of 0 or 1) and paraeducator roles (i.e., 12 textbooks with a rating of 0 or 1). Additionally, several textbooks emphasized the paraeducator roles without giving equal emphasis on the teacher roles in relation to paraeducators, especially in regard to observation, on-the-job training, and performance feedback. Administrator roles and paraeducator evaluation was inadequately covered in textbooks, especially considering the substantial role administrators have related to paraeducator supervision and evaluation (Douglas et al., 2016).

Teachers must gain knowledge of the roles of paraeducators, and the roles of teachers in supporting paraeducator training/feedback, planning lessons, scheduling, communication, and teamwork (Biggs et al., 2016; Chopra et al., 2011). Research confirms that quality teacher supervision leads to more effective paraeducator supports within inclusive and other educational placements (Chopra et al., 2011). Therefore, content within introductory textbooks is critical to support faculty in higher education in delivering relevant paraeducator focused content to pre-service teachers (Sobeck et al., 2020).

Limitations and Future Research Directions

Despite the important addition this study provides to the literature, several limitations exist that should be addressed in future research. Although it is possible that teacher preparation programs use a wide variety of resources (e.g., other textbooks, readings, in-class activities, practicum experiences, and/or course content) to cover paraeducator related content, this review only included introductory special education textbooks with the knowledge that many pre-service teachers (i.e., general education teachers) are often provided with only one introductory special education course. Therefore, future research should explore paraeducator content in other textbooks and within pre-service coursework generally.

Additionally, as part of the study we did not determine the overall use of the textbooks in our review within teacher training programs. However, this information might be valuable to provide additional clarity of the paraeducator content being provided within introductory special education courses. Future research might explore the inclusion of paraeducator content through analysis of introductory special education syllabi or surveys to pre-service teachers taking or higher education faculty teaching introductory special education courses.

Within this study we did not explore the textbooks that are utilized in graduate level preparation for administrators. Given the important roles administrators play in supporting teacher/paraeducator teams, and establishing school policies, procedures, and culture, future research might explore paraeducator content within administrator preparation including course and textbook content.

Finally, although coding reliability was established, no member check was made with textbook authors. However, double coding was conducted for all textbooks with high reliability. Future research might consider inclusion of a “member check” with authors to further validate findings.

Implications for Practice

Given the overall lack of paraeducator content within the reviewed textbooks, teacher preparation programs should consider several steps to ensure pre-service general and special education teachers are prepared for their roles with paraeducators. First, faculty should carefully evaluate paraeducator content within introductory special education courses required for general and special education teachers, with a focus on preparation for teacher supervisory roles with paraeducators. Evaluation might include review of textbooks, course content, and/or the addition of supplementary materials (e.g., state resources such as those provided in Connecticut¹ and Virginia²). The rubric within this study includes basic roles of supervising teachers and paraeducators, linked to professional standards, which may be helpful in such a review. Next, programs preparing pre-service teachers should advocate for better representation of paraeducator content within textbooks. Contact with publishers/authors about gaps in current textbooks might help support appropriate inclusion of paraeducator content in future editions. Furthermore, institutes of higher education should survey recent graduates to determine how they might better prepare teachers in their roles with paraeducators. Finally, given common use of paraeducators in the field, and the expectation of teacher supervision of paraeducators within classrooms, accreditation organizations should ensure that paraeducator content is part of pre-service teacher curriculum and addressed as part of the accreditation process.

Conclusion

This review provides insights into the paraeducator content found within introductory special education textbooks. It is essential that the field moves toward expanded content related to paraeducators within teacher preparation programs, including positive examples of the roles of teachers, paraeducators, and administrators. Highlighting supervisory responsibilities with paraeducators will provide pre-service general and special education teachers with an understanding of their critical role and enable educators to provide more appropriate supports to paraeducators to perform their roles and responsibilities.

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About the Authors

Sarah N. Douglas, Ph.D. obtained her degree from Pennsylvania State University. She is an associate professor at Michigan State University. Her research interests include paraeducators, communication and social interventions for children with developmental disabilities and autism, and augmentative and alternative communication. She can be reached by email at: sdouglas@msu.edu

Denise J. Uitto, Ed.D. obtained her degree from Ashland University. She is retired faculty from University of Akron Wayne College. Her research interests include paraeducators, their training and their supervision by teachers and administrators. She can be reached by email at: edconnectlearning@gmail.com

Sophia D'Agostino, Ph.D. obtained her degree from Michigan State University. She is an assistant professor at Hope College. Her research focuses on early childhood inclusion practices including naturalistic developmental behavioral interventions, training and coaching of practitioners using telepractice, and social validity assessment. She can be reached by email at: dagostino@hope.edu

Classroom Membership: What Does That Mean Exactly?

**Dr. Katie Heath
Roberts Wesleyan College**

Abstract

Classroom membership is essential in today's classrooms as students need to feel safe and secure in their participatory roles. Allowing a student's voice is essential in allowing them the opportunity to communicate with their peers. In this study, the author looked at how the use or non-use of the iPad (as a form of assistive technology) affected membership of students with disabilities. Findings showed that iPad integration played a vital role in increasing or decreasing participation through communication and the feelings of membership in the classroom. Ultimately, how the teacher plans and prepares for the integration of the iPad into the classroom ultimately affects the membership opportunities for students with disabilities. Included are the stories of four students and their use of the iPad.

Classroom Membership: What Does That Mean Exactly?

What does classroom membership mean? Why should students with disabilities want to be a member of the classroom? How does assistive technology use affect classroom membership? These are the questions that teachers in this study grappled with. To feel a sense of classroom membership, teachers need to set up a safe and respectful classroom community. A classroom community is essential when creating a space that encourages learning (Morgan, 2015). Classroom membership within the classroom community involves students having a voice in the educational process. This paper defines student voice as "a term that honors the participatory roles (including communication) that students have when they enter learning spaces like classrooms" (Byker et al., 2017). Marginalization of students with disabilities is common in the classroom because of their needs and differing abilities, often times related to the way they communicate (Jorgensen & Lambert, 2012; Morgan, 2015). Teachers need to be in tune with what each of their students need and how to best support them within the classroom community.

Teacher planning and preparation are key components in the creation of a strong classroom community (Jorgensen & Lambert, 2012). Teachers' awareness of the services, student needs, accommodations, and modifications for each student plays a part in the planning and preparation for students with disabilities. Teacher awareness of services is especially important when students with disabilities need an assistive technology (AT) device in order to succeed within the educational environment. One common form of AT device being used in schools is the tablet. Tablet computers provide the opportunity for independent learning (McClanahan, 2012). They have multiple built-in accessibility features such as screen magnification and text to speech/speech to text that allow students with disabilities to interact with the academic climate, seamlessly. These types of devices allow for instruction to become portable and affordable (Najmi & Lee, 2009). In this study, the author looked at how the use or non-use of a specific tablet, the iPad, affected membership with students with low incidence disabilities. The author also looked at what affects classroom community and participation with a focus on the use of AT integration. The inclusion criteria for this study included teacher participants who had students

currently with a disability label that fell under one of the low incidence disabilities and someone who used an iPad in the classroom.

Theoretical Framework

The theoretical framework of this study is rooted in the social construction of disability, focusing specifically on the presumption of competence. Asch and Fine (1988) were the first to define the social construction of disability. They determined that, "...it is the attitudes and institutions of the non-disabled, even more than the biological characteristics of the disabled that turn characteristics into handicaps" (Asch & Fine, 1988, p. 7). This perspective of disability includes a definition constructed by people who are not disabled (Jones, 1996). Having a social constructionist mindset on disability means that one celebrates the uniqueness of the individual and looks for ways to remove oppressive structures (Jones, 1996). It is within this mindset that technology use fits within the discourse on disability. Teachers need to remove accessibility barriers in the classroom and provide tools to students with disabilities that will help them individually succeed within the educational environment.

Also, within a social constructionist mindset, teachers need to learn how to presume the competence of all their students. Biklen and Burke (2006) explain the presumption of competence as allowing others to reveal their thinking without assuming what they do or do not know. There is a connection between the presumption of competence and the intellectual capacity of a student, specifically, the student's ability to verbally communicate (Biklen & Kliever, 2006). When teachers presume competence, they discover how to meet the needs of their students. They can tailor their instruction to enhance the opportunities of students with disabilities (Biklen, 1990; Blatt, 1999; Kliever, 1998); this is where the intersection between technology and disability comes into play. In schools, the presumption of competence is often related to the educational approaches available (Biklen, 1990; Blatt, 1999; Kliever, 1998), thus either hindering or promoting the use of technology. Educational approaches employed in a classroom are grounded in presuming the competence of the students in the classroom (Jorgensen & Lambert, 2012). Teachers plan activities and lessons around the idea that they can instill knowledge and learning into their students. The presumption of competence opposes the idea of making judgements about students due to their level of capacity or performance (Jorgensen & Lambert, 2012). It ensures that teachers' educational approaches are conducted with high fidelity and high expectations (Jorgensen & Lambert, 2012). Teachers face the challenge when students with more significant disabilities are not able to show their knowledge in the same way as other students, by speaking, writing, or typing (Jorgensen & Lambert, 2012). Jorgensen and Lambert (2012) explain that it is important to remember,

Even if students never show that they have mastered all that they have been taught, it is far more dangerous to presume that students will never learn and then find out that they might have, had they been provided with high quality instruction and assistive technology to support their communication and literacy skills (as stated in Jorgensen, 2005, p.29).

As authors Biklen and Kliever (2006) state, competence is socially constructed. The authors continue to explain this idea by stating, "This is by way of saying that disability categories are not 'given' or 'real' on their own. Rather, autism, mental retardation and competence are what

any of us make them” (Biklen & Kliever, 2006, p. 182). Therefore, to change this way of thinking, teachers must inherently change their mindset on students with disabilities.

Presentation of Problem

AT devices are commonly found in conjunction with students with disabilities and are commonly used in today’s classrooms due to Federal mandates. The Individuals with Disabilities Education Act (IDEA) also known as the Individuals with Disabilities Education Improvement Act (IDEIA) mandated the consideration of AT devices and services when creating a student’s Individualized Education Program or IEP [IDEIA, 2004), 20 U.S.C. & 1401 (251)]. The Federal definition for AT is, “any item, piece of equipment or product system, whether acquired commercially or off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities” [IDEIA, 2004), 20 U.S.C. & 1401 (251)]. Students with disabilities rely on AT devices to access the curriculum and other educational opportunities (Gray et al., 2011).

One common tablet, the iPad is used as an AT device because it is more affordable, portable, and versatile than other types of specialized AT devices, such as augmentative and alternative communication devices (Najmi & Lee, 2009). More students are familiar with the functions of an iPad or iPhone because of the commonality of these devices. Therefore, the learning curve for a specific tablet or Smartphone is shorter than if students used a specialized device (Rodriguez et al., 2013).

The issue being seen is that even though these devices provide ample opportunities for accessing materials and providing assistance in areas of need, teachers are not using them to their potential. Students use devices in other ways like game-playing (Flewitt et al., 2015) and not for the IEPs intended purpose. Device use ultimately affects the student’s membership in the classroom (Byker et al., 2017). Therefore, students receive fewer educational opportunities. The challenge arises when students with low incidence disabilities cannot participate to the fullest extent because they are unable to show their knowledge in the same ways as students without disabilities (Jorgensen & Lambert, 2012). As a result, students need supports in place to become valued members and equal participants in the classroom (Jorgensen & Lambert, 2012; Morgan, 2015). These supports come in the form of accommodations, strategies, and interventions that technology can assist in creating opportunities for participation in the general education classroom (Morgan, 2015). In this study, the author looked at four different participants’ stories and how the use of their required devices affected the opportunities they had in the classroom.

Review of Literature

Technology integration influences students in a multitude of ways, including the membership and participation of the student. Membership can be defined as being a part of a group. Taking part or participating in group activities is essential for students with disabilities because it helps them to make progress within the general education curriculum. Jorgensen and Lambert (2012) found that when teachers used the Beyond Access Model to plan for supports for students with disabilities, consequently the students’ membership, participation, and learning were influenced positively. The Beyond Access Model’s planning process consists of five questions that teachers need to answer prior to instituting classroom lessons:

1. What is the general education instructional routine?
2. What are students without disabilities doing to participate in the instructional routine?
3. Can the student with the disability participate in the same way in all components of the instructional routine or does the student need an alternate way to participate?
4. What supports does the student need to participate using alternate means?
5. Who will prepare the supports? (Jorgensen & Lambert, 2012, p.24)

Classroom Community and Participation

Student inclusion directly relates to classroom community and participation (Jorgensen & Lambert, 2012). Jorgensen and Lambert (2012) stated that effective inclusion requires a student with a disability to not only be physically present within a classroom but also to be engaged academically with the other students. This type of inclusion encourages the teacher to plan instruction purposefully for every lesson (Jorgensen & Lambert, 2012). However, personal beliefs and practices may impact the planning decisions of a teacher (Sileo et al., 2008). Teachers need to plan not only for their instructional processes but plan participation opportunities for students with disabilities (Jorgensen & Lambert, 2012; Sileo et al., 2008). Many schools have a variety of technologies at their disposal, but the readiness of teachers to integrate technology plays a factor (Inan & Lowther, 2010). The practices of the teachers, whether that be choosing to use technology or not, affect the participation and membership of the students in the classroom.

AT is one form of support and/or service that affords students with disabilities the ability to increase their opportunities to be academically successful by heightening participation opportunities (Morgan, 2012). AT can be an asset to the communicative needs of students with disabilities. Authors Byker and colleagues (2017) explain that technological tools and devices assist students with disabilities. “With new modes of communication available through digital tools and devices-email, messaging, blogs, websites, not to mention various apps and programs-there seems to be great potential to increase opportunities for students to engage with their teachers” (Byker et al., 2017, p. 121). Their study found that “student voice” was associated with the opportunities for communication of student opinions (Byker et al., 2017). Thus, teachers need to utilize technology to empower “student voice” opportunities (Byker et al., 2017).

Assistive Technology Integration

AT is a term associated with students with disabilities. This term was first defined in 1988 by the Technology Related Assistance for Individuals with Disabilities Act, which secured funds for students with disabilities for technology-related services (Nepo, 2017). Later, the Individuals with Disabilities Education Act (IDEA) focused on AT use for students with disabilities and made the term more wide-spread (Jones & Hinesmon-Matthew, 2014).

The goal of matching AT to a specific student is to make accomplishing a specific task easier and level the playing field for students with disabilities (Parette & Peterson-Karlan, 2007). Multiple authors agreed that AT provides students with supports and scaffolds instruction to promote participation (Bouck et al., 2011; Caverly & Fitzgibbons, 2007; Judge et al., 2008). Researchers also explained that AT promotes membership in the classroom by promoting cooperative learning (Alexandersson, 2011), ultimately affecting classroom participation.

Using AT. Technology, especially AT, can enhance classroom learning and affect membership and participation in the classroom. Researchers, Murray and Olcese (2011) found that through the use of technology, visual, auditory, and tactile tools promote multi-modal education. They also explained that teachers can use devices for tutoring, exploring, and communicating (Murray & Olcese, 2011). The United States Department of Education promotes the use of technology and its ability to help students learn in a variety of methods, specifically assisting students with diverse needs (IDEIA, 2004).

In schools, teachers may use technology as an instructional and/or assistive tool (Douglas et al., 2012). Schools and teachers use iPads for both purposes. iPads are popular devices currently used in classrooms because they can support individualized instruction (Rodriguez et al., 2013). They are practical, non-stigmatizing, portable, affordable, and have built-in accessibility features (Najmi & Lee, 2009). iPads offer one-to-one, self-paced, tailored instruction when the user uploads the appropriate applications (McClanahan, 2012). Students with disabilities benefit from one-to-one, tailored instruction that meets their needs and the ability to learn at their own pace (McClanahan, 2012).

iPads provide endless options for learning through the variety of apps available for communication, emotional development, sensory and visual perception, visual and auditory, language development, and life skills (Etherington, 2011). There is evidence that students with disabilities respond positively to the responsive nature of the iPad and the immediacy of feedback from the device (Flewitt et al., 2015). Unfortunately, few researchers have explored iPad use with students with disabilities, in special education (O'Malley et al., 2013; Reichle, 2011). As explained by Reichle (2011), many of the AT devices used with students with disabilities involved non-tablet devices. One specific study by O'Malley and colleagues (2013) found that iPads positively affected student engagement, interest, and independence within instruction. Students with disabilities who require a specific form of AT, as stated in their IEP, need the technology integrated into the classroom in order to succeed in their education. Teachers need to remember that there are both positive and negative effects of integrating this form of technology and that their beliefs and practices also bring about these effects (Sileo et al., 2008). Personal values and beliefs impact the decisions teachers make (Sileo et al., 2008), thus ultimately affecting the use of the device as planned for by the teacher and the limitation of full membership such as the ability to communicate with others. As a result, there needs to be a direct connection between the matched device, student, and student needs (O'Malley et al., 2013).

Why iPads? iPads provide a benefit to schools and classrooms because they are more affordable, versatile, mobile, and customizable (Etherington, 2011; Hu & Garimella, 2014; Shuler, 2009b). The iPad is a tablet PC that came to the market in 2010 by Apple Corporation and has seen much of its use within the educational context (Hu & Garimella, 2014). Apple has sold over 20 million iPads in the United States and out of all tablets sold, 99.8% used are iPads (Etherington, 2011). In a manuscript by An & Alon (2013) the reasoning for iPad usage was explained: "iPads equipped with applications, otherwise known as 'apps,' purport to be educational, tend to keep children occupied, and appear to help motivate children to learn, thus encouraging many K-12 schools to invest funds for the purchase of iPads and apps" (An & Alon, 2013, p.3005). iPads provide customizable instruction through the App Store (Shuler, 2009b).

An app is short for application; the definition of an app is software that extends the capabilities of a phone or tablet that allows users to accomplish and perform specific tasks (Purcell et al., 2010). Teachers can embed apps into the learning process to meet the needs of their students (Shuler, 2009b). For teachers to meet the needs of their students, Rodriguez and colleagues (2013) explained that there needed to be a strong fit between the iPad usage and instruction. This included purposeful planning and allowing the students to use the iPads in different settings and environments (Rodriguez et al., 2013). Rodriguez and colleagues (2013) further explained the connection between technology and instruction as a strong focus on student needs through the specific usage of apps.

Researchers have found multiple benefits to iPad usage with students. Benefits of integrating iPads included not only increased learning academically, but also benefits in communication, visual attentiveness, reaching, and activating (Campaña & Ouimet, 2015). As a result, students were able to take responsibility for their learning, learn through an alternative path, and personalize their learning (Gray et al., 2011). Research by Flewitt and colleagues (2014) found that iPads provided multiple benefits for students with disabilities because they allowed for effortless touch and provided immediate rewards, which in turn increased engagement. The researchers specifically looked at how teachers adapted iPads to suit the needs of students with disabilities (Flewitt et al., 2014). The focus of the study was on how teachers embedded iPads into classroom settings to build upon communication and literacy. The researchers discovered that the sensory and kinesthetic performance of touch technology from the iPad enabled and motivated the students to reach independence in their literacy skills (Flewitt et al., 2014). Increased independence then led to increased inclusivity within the classroom because students with disabilities took part in classroom activities through small group iPad instruction due to their portability and size (Flewitt et al., 2014).

In this study, the author researched how students with low incidence disabilities use technology, particularly if the technology was used as the IEP stated. The author also focused on if teacher planning and student use ultimately affected the membership and participation of the student. This is important to understand in order for schools and teachers to provide positive educational opportunities for all students.

Methods

For this article, the focus was specifically on the use or non-use of a tablet device, specifically how an iPad affects membership in the classroom. The methods addressed the following research question in the kindergarten through sixth-grade settings:

1. How does use or non-use of iPads, as an assistive technology device, affect the membership and participation of students with disabilities?

Research Design

Qualitative research design provided a basis for this study. The research strategy involved a combination of systematic design and constructivist design with open coding conducted with the data. Access to participants came from different data collection methods including semi-structured interviews, observations, document analysis, and tracking tool. The interviews allowed the researcher to gain a better understanding of the teachers' thought processes when integrating technology. Consequently, the data from the observations and tracking tool provided

information regarding whether what the teachers stated actually occurred. The research involved careful, in-depth studies of the individuals and situations (Johnson & Christensen, 2008). Once IRB approval was gained, the author identified four participant groups, which included the corresponding teacher(s) and student. These participants were observed and interviewed to see how they implemented iPads in their inclusive setting.

Participants. The setting included four different school sites across a large northeastern state, presented using pseudonyms. Three of the schools were elementary schools and one was a middle school. Recruitment occurred by contacting administrators, such as the Director of Special Education, in the hopes of finding teams that already integrated iPads into their classroom (purposive sampling). Then, conversations were held with familiar administrators in the area in which they suggested certain teacher teams that they knew had students that utilized iPads. During recruitment, administrators identified the teams already integrating technology and iPads into the classroom. Once identified, contacts were made to see if the teachers were willing to participate in an interview and multiple observations. The selection of teachers led to a specific student. If the student fit the criteria (had a low incidence disability) and the parent consented, then he/she became a participant. Interviews and observations involved each student and teacher participant.

For teachers to fit within the participant criteria, they had to have a student who used an iPad and had a low incidence disability. Once the participants fit the criteria, they were both interviewed and observed. For this study, the author used the definitions of low incidence disabilities from IDEIA in conjunction with the definition from CAST (Center for Applied Special Technology). Students with low incidence disabilities vary from students with high incidence disabilities because of the prevalence of students falling under each category (Jackson, 2005). IDEIA (2004) places students with low incidence disabilities in Category C. Category C students are students with low incidence disabilities, thus requiring highly specialized teachers to know how to meet their needs (IDEIA, 2004). Section 1462 of IDEIA (2004) states,

Preparing personnel in the innovative uses and application of technology, including universally designed technologies, assistive technology devices, and assistive technology services—

- (i) to enhance learning by children with low incidence disabilities through early intervention, educational, and transitional services; and
- (ii) to improve communication with parents.

Table 1 depicts the different disability categories that fall under low incidence disabilities versus the categories that constitute high incidence disabilities from both IDEIA and CAST.

Table 1
Low Incidence Disabilities (LI) vs. High Incidence Disabilities (HI)

IDEIA (LI)	CAST (LI)	IDEIA (HI)	CAST (HI)
Intellectual Disability	Blindness	Speech and Language Disability	Communication Disorders
Hearing Impairment	Low Vision	Specific Learning Disability	Specific Learning Disability (including ADHD)
Orthopedic Impairment	Hard-of-hearing	Emotional Behavioral Disorder	Mild/moderate Intellectual Disability
Visual Impairment including Blindness	Deaf-blindness		Emotional or Behavioral Disorders
Deaf-blindness	Significant Developmental Delay		
Deafness	Complex Health Issues		
Other Health Impairments	Serious Physical Impairment		
Autism Spectrum Disorder	Multiple Disabilities		
Traumatic Brain Injury	Autism		
Multiple Disabilities			

The four student participants used in the present study, came from different grade levels and different school districts. The four student participants were Mike, Billy, Theresa, and Ben (pseudonyms). Mike was a sixth-grade student who received educational instruction within a co-taught classroom in the Everly District (pseudonyms). He used his iPad for visual access but did not use this device during his interview. One of his IEP goals related to vision due to his visual impairment. The technology allowed him visual access to complete assignments and/or tasks. He had access to an iPad throughout his entire school day, and he was the only student in a class of nine girls and 12 boys who had access to an iPad. His two math co-teachers, Mr. Pine and Mrs. Perry (pseudonyms), also participated in the study through interviews and observations. His case manager, Mrs. Mallard, also provided an interview.

The second student interviewed and observed for this study was Billy. Billy provided a verbal interview. Billy was a 2nd-grade student in the Wellington District (pseudonym). All students in this second-grade class had iPads for individual use. Billy used the iPad to support various areas of need. Billy's two co-teachers participated in the study (pseudonyms). Mr. Pintak was the special education teacher who provided special education supports in Billy's general education classes. He also provided Billy with support in a resource room setting. Mrs. Credence was Billy's 2nd-grade general education teacher. Both Mr. Pintak and Mrs. Credence provided interviews and were observed.

Theresa was the third student participant in this study. She attended school in the Littleton District (pseudonym). She was a 5th-grade student who had both a general education teacher and special education teacher who taught together. Theresa rarely spent any instructional time in the general education classroom. During Theresa's interview, she used a communication board. One interview occurred with Mrs. Mellet (pseudonym), Theresa's special education teacher. On the other hand, both interviews and an observation of Mrs. Chancy (pseudonym), the paraprofessional, occurred. Theresa was identified with Autism Spectrum Disorder and her IEP stated that an iPad was needed for her to access the general education curriculum. The other students, in class with Theresa, had access to laptops but only used them sporadically. Theresa's mother also answered interview questions regarding Theresa's iPad use at home and school.

Ben was the last student to be observed. He was a 4th-grade student at the Cedar District (pseudonym). Ben had autism and had an iPad provided to him for communication purposes. All the other students in his class had iPads for individual use. Mrs. Tindle (pseudonym), Ben's general education teacher, also provided an interview. Only two observations occurred due to limited access.

For this study, three student participants had the identification of Autism Spectrum Disorder and one had a visual impairment. There were three special education teachers, four general education teachers, and one paraprofessional. Finally, there was one parent and one case manager who agreed to be interviewed. The author initiated interviews with all parents and guardians of the students, but only one consented to participate. The interviews and observations of the students, teachers, and parent participant provided data on iPad use to support student needs. Table 2 depicts the participant data.

Table 2
Participant Profiles

	School One Everly District			School Two Wellington District		School Three Littleton District		School Four Cedar District
Student	Mike			Billy		Theresa		Ben
Grade	Sixth grade			Second grade		Fifth grade		Fourth grade
Eligibility Category	Visual Impairment			Autism		Autism		Autism
Parent						Mrs. Fairfield		
Teacher Position	Mrs. Mallard	Mr. Pine	Mrs. Perry	Mr. Pintak	Mrs. Credence	Mrs. Mellet	Mrs. Chancy	Mrs. Tindle
	Case Manager	SPED	Gen. Ed	SPED	Gen. Ed	SPED	1 to 1 aide	Gen. Ed.

Data collection. The data collection methods included interviews, observations, and data from the IEPs. Each data collection method provided necessary information about the “how” and “why” of iPad integration, thus helping to inform the researcher about a student’s membership and participation in the classroom. The data included four schools. The students, teachers, and parent from each school participated in observations and interviews. Figure 1 includes information on the participant selection procedure and data collection measures.

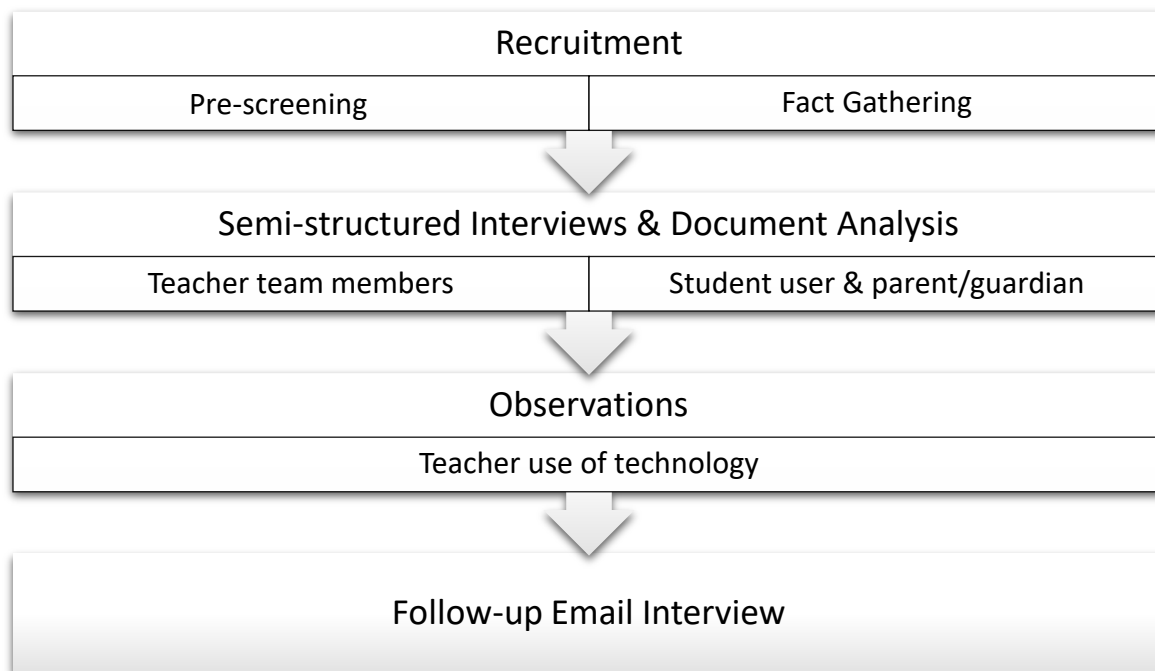


Figure 1: *Participant Selection Procedure*

The semi-structured interviews occurred at the beginning (in person) and then through email at the end of the study. The interview questions focused on what support looked like and the meaning of support, what integration of an iPad means and looks like, how iPads support student needs, and how iPads provide access to classroom activities. Additionally, the parent interview included questions about the child's AT acquisition process and the child's use of the iPad. Interviews occurred with three of the student participants and these questions focused on using technology in school.

The observations occurred throughout various points in the day. During the observations, use of the iPads with the students and the interactions between the student and the teachers were the focus. The iPad tracking tool provided information about iPad use. It reported the use location, who implemented the device, the activity, a description of the use, and the duration. The author then filled in the related goal from the IEP for any student that used the iPad during the observation. The observations occurred over six weeks and included six to seven observations for three of the participants and two observations for one student.

Data were also collected through the document analysis of student IEPs. Both parents and school districts provided consent for accessing all IEP documents. There was access to two IEPs from the Wellington and Littleton District. In the Everly District, the case manager verbally described the IEP. The IEPs were highlighted according to the services the students received and their goals.

Instrumentation. The interviews occurred before and after observations. Questions for participant groups were similar, although framed to fit the participant and the context. Teacher questions included information about themselves as teachers, their experiences with AT, how iPads helped students in the classroom, and what factors most influenced iPad integration. The interview guide for the parent/guardian included questions regarding the AT acquisition process, how iPads helped their child access the curriculum, and what the parent would do differently regarding AT integration. The interview guide for the student users included questions on the types of technology they liked to use in school, how these tools helped them succeed in learning, and the specific experiences they had with iPads in the classroom. During the observation, data collection focused on how iPad use and activities related to specific student needs. The observation tool helped correlate classroom activities with student's instructional and communication needs and individual goals. The tool helped to track whether or not the instructional activities and lessons that occurred when the iPad was in use supported specific goals and needs.

Data analysis. To analyze the data from the interviews and observations, the author evaluated the transcripts and field notes. The author coded the transcripts and field notes looking for pertinent ideas and themes. These themes can be found in Table 3. Open coding provided codes that reappeared throughout the data previously not captured with the initial codes (Bogdan & Biklen, 2007). These became the categories and sub-categories.

Table 3
Data Codes

Initial Codes	Codes & Sub-codes from Data	Coding Themes	Codes not Related to Technology Use
Types of Technology	-Experiences with AT AT used Technology used AT Knowledge	-Visual Access Uses in Different Settings Universal Use Individual Use Visual Stimulation Motivation Playing for Fun Occupying Time Non-use Distraction -Teacher Practices versus Teacher Beliefs Pedagogy of Competence Individualized Learning Repetition & Reinforcement Pedagogy of Participation Teaching Strategies	-Choosing Teaching -Characteristics of a Teacher -Teaching Strategies
Influence of Technology	-Promotion of Inclusivity -Why not to use Technology Teacher Perceptions Learning Curve Distraction Involves Planning Ahead -Benefits of Technology How Technology Supports Student Access Engagement Motivational		
iPad Use	-How iPads are Used Reinforcement Game Playing		

Repetition
Universal Use
Visual Models
Individualization
Promotes
Independence
Provides
Accommodations
-Form of AT

Trustworthiness. Guba, as stated in the research of Shenton (2004), considered four criteria to ensure trustworthiness in a study. The four criteria included credibility, transferability, dependability, and confirmability. Regarding credibility, the author ensured an accurate representation of their experiences (Shenton, 2004) through different data gathering methods such as interviews with different participants, observations, detailed descriptions of what occurred, and a reflective commentary as researcher. The different sources of data also helped with triangulation (Mawson, 2007). Trustworthiness and transferability included applying this study to other situations and accumulating data across settings and in multiple environments (Shenton, 2004). The different settings included collecting data in suburban and rural schools throughout kindergarten-sixth-grade environments. The study's participants taught in any inclusive classroom environment whether that be a homeroom classroom or a content area classroom, which created a stronger transferability in order to gain a more inclusive, overall picture. The author addressed dependability through the detailed process of the study (Shenton, 2004). The research included in-depth coverage of the methods, including the planning and execution, as well as the evaluation of the effectiveness of the process (Shenton, 2004). Finally, the author addressed confirmability of the study to determine that the findings were a result of the experiences and thoughts of the participants (Shenton, 2004). By addressing the four criteria presented in the article by Shenton (2004), reliability and validity were addressed through the concept of trustworthiness.

Findings & Discussion

After reviewing the categories, major themes appeared. The major themes included visual access, universal use, playing for fun, non-use, and teacher practices vs. teacher beliefs. Table 3 depicts the themes of the larger study. The focus of this paper was on the participation aspects of each student. The author found that the integration of the devices affected student membership and participation. Through these stories and experiences, the use or non-use of devices proved to affect their educational participation and membership.

Inclusionary Participation and Membership

Out of the four students observed, the use of the iPad by two students positively affected their membership in the classroom. On the other hand, there were two students where non-use of the device resulted in limited membership and participation. The observations of Mike and Billy exhibited strong membership and participation in the classroom. Mike's teachers provided access to the curriculum through technology for Mike. The teachers integrated the iPad into Math class,

daily. As a result, Mike was able to engage in the classroom content and participate in each math activity. On the other hand, device integration had not yet occurred in other settings or with other teachers. During Math class observations, when the teachers integrated the iPad, Mike's participation and membership increased. He had the same opportunities to engage with the content as did all of the other students.

Billy's use of the iPad also promoted his membership and participation in the classroom. The way his teachers integrated the device allowed for heightened learning experiences and increased participation opportunities. For example, Billy's teachers used the iPad to help him learn the content through different learning styles. Billy was able to interact with the content through a virtual, hands-on method by using the iPad. Billy benefitted from this type of use because it allowed him the opportunity to engage in repeated practice of the content material, as stated in his IEP. Thus, Billy's teachers created a classroom in which he could be included by offering opportunities for membership and participation. For both Mike and Billy, the teachers showed their expectations for the students and expressed in interviews that best practice for technology integration includes the integration of the iPad during learning experiences.

Exclusionary Participation and Membership

Exclusion occurred for Theresa and Ben with the non-integration of the iPads into the learning environment. Theresa and Ben encountered a sense of physical separation from their classmates because they were unable to use their devices for the intended purpose of communication. However, most of the time, they were using the devices for entertainment purposes other than for purposes stated in their IEP. As a result, their membership and participation decreased, and the students experienced exclusion from learning with their peers, as well as interacting with them. In the end, the teachers made the final decision whether or not to integrate the device into classroom activities and when they did not integrate the device, they contradicted the IEP requirements. As a result, they affected the students' membership and participation in the classroom.

Teacher Practices vs. Beliefs

Through the interviews, findings showed that each of the teachers believed that overall technology integration was important, but only two were using the devices with the participants. This demonstrates that there was disconnect between belief and practice. Their understanding of "use" was different than the research's definition. Use goes beyond interaction and involves purposeful planning and incorporation into learning activities (Rodriguez et al., 2013). Rodriguez and colleagues (2013) define use with regard to video modeling and communication. As a result, the iPad inadvertently affected the membership and participation of each student either positively or negatively.

The findings from Theresa and Ben's teachers show that their willingness to integrate a device affected the membership and participation in the classroom for the two participants. In this study, the device of choice was the iPad, but the findings generalize to the use of any tablet device. Often a teacher's philosophy reflects the willingness to employ certain practices (Inan & Lowther, 2010). A teacher's philosophy involves personal ideas and beliefs about students and teaching. Thus, ultimately affecting their personal beliefs on the importance of AT integration. When a teacher does not practice the importance of integrating technology that is needed for the

student, the teacher is showing that this is not a priority in his/her teaching philosophy. While authors deemed technology integration as important, many authors found various barriers to implementing technology devices.

Barriers

Much of the literature pointed out that while there were benefits to integrating technology, barriers existed within schools that deterred teachers from integrating the devices effectively. According to ABLEDATA, an online database of assistive technology, there are over 20,000 available different AT devices (Bausch & Hasselbring, 2004), but educators are ill informed about these devices and allocation (Beyerbach et al., 2001; Bushrow & Turner, 1994; Kurtts et al., 2012). These hurdles lead to the barriers seen in schools relating to technology integration. School-wide barriers include access and availability of devices, support/training for teachers, lack of knowledge on how to integrate the device, and lack of time (Alper & Raharinirina, 2006; An & Alon, 2013; Bausch & Hasselbring, 2004; Beyerbach et al., 2001; Flewitt et al., 2015; Inan & Lowther, 2009).

Benefits

Through this study, the author found that a teacher's philosophy about pedagogy and planning impacts the successful implementation of a device. The iPads, when connected to content and communication, provided a means of different ways to engage in the classroom, and the teachers believed that these devices provided their students with benefits. In the interviews, the teachers expressed their feelings about device usage and how this type of technology supported students with low incidence disabilities in inclusive settings. Specifically, the teachers responded about how assistive technology provided benefits.

Mrs. Credence: I think what it allows them is a pacing alternative...It gives them practice and exposure.

Mrs. Tindle: ...it's the voice for many of them. Now they can communicate.

Mrs. Chancy: ...it gives them more visuals.

Mrs. Mellet:...I think it can help them with communication.

Mr. Pintak: ...having a tool to quickly get your thoughts out has been fantastic to really get kids to realize that they do have a voice and they can have a reciprocal conversation back and forth even if that's one picture, one word.

Mr. Pine: ...I really loved it because it differentiated instruction for everyone at the same time. And so kids that had disabilities in math or needed extra practice, they could work at their own pace and students who excelled and needed more challenges could move on and go onto the challenge problems.

Overall, the teachers believed that iPads provided multiple benefits for students that included: hands-on learning, incentives, motivation, engagement, independence, reinforcement, and supporting the lesson.

Multiple studies referenced in the literature also expressed that the use of iPads provides benefits to student users. One study, in particular by Johnson and colleagues (2013) found that iPad use positively affected student engagement, helped to reinforce core curriculum, and helped students with disabilities increase communication and social skills, which is supported by these findings.

Not only did the teachers in this study see the same benefits, but they also explained that iPads provided a way for teachers to differentiate instruction, make learning easier and quicker, and create a more interactive learning opportunity, all while not making the student feel different than everyone else.

The above quotes and context provided insight into the teacher's beliefs that technology helped students with disabilities. The question is if they believed that these devices helped, then why were these devices not used in these ways during classroom instruction? It came down to the teachers exhibiting their presumption of competence in the classroom for these students. There appeared to be a disconnect between beliefs and practices. The teachers in this study focused on individualized learning/differentiation and repetition and reinforcement as key strategies to increase student participation and knowledge.

Through the literature review, it was found that successful implementation occurs when there is a parallel between technology use and teacher knowledge on instructional planning (Connor & Beard, 2015; Jorgensen & Lambert, 2012). This includes teachers being able to integrate technology in various ways so that students have to learn through many different avenues. Connor and Beard (2015) found a connection between teacher knowledge and AT use. They stated that when teachers possess the necessary knowledge about a specific device and feel comfortable using the device there is a higher likelihood of integrating the device into the classroom (Connor & Beard, 2015).

Positives of iPad Integration

What happens when teachers integrate iPads in a positive way? There are multiple positive consequences to iPad integration found in this study which are supported by the literature. The integration of iPads in the classroom not only allows for access to the curriculum, but also provides educational benefits such as increasing engagement, satisfaction, and overall teaching effectiveness (Rodriquez et al., 2013). During the interviews, the teachers expressed how beneficial they saw the iPads in allowing their students to access the classroom environment and increase membership. The teachers in this study explained that the iPads allowed students to access not only the curriculum but also access other students in group situations. As such, these devices (whether it be iPads or any tablet) provide an alternative way for the students to be more engaged and allows for them to become more independent with their learning and social interactions. The iPads provided a means of communication for some students that they otherwise would not have had. Being able to independently communicate with their peers provided them with a social component that was previously missing. Both Duhaney and Duhaney (2000) and Alexandersson (2011) found that using assistive technology in this manner not only promoted cooperative learning, but also allowed students to take control of their learning. The devices brought together students instead of creating stigma or separation.

As found in the literature, it is not always easy to meet the needs of your students without the necessary tools. Some studies provided tips for learning more about the students and what they need as it relates to AT devices like the iPad (Coleman, 2011; Judge et al., 2008; & Runyan, 2013). For one, there is great importance of knowing the student's instructional requirements so that individual needs could be met. For example, Coleman (2011) provided a checklist for matching students to technology. The checklist addressed what services the student might need,

psychosocial, cultural, and environmental factors, curriculum access needs, and specific curriculum area needs and may help to address the different areas of the child and where their weaknesses might fall. Judge and colleagues (2008) also guided teachers on how to meet the needs of all students in the classroom. They worked with teachers to create an AT toolkit in their classroom that supported students' needs. By creating an AT toolkit, teachers plan ahead for all students and, further, by anticipating the learning, language, motor, and sensory needs of students, teachers can create a toolkit of various AT devices appropriate for any student at any time (Judge et al., 2008). As a result, children can gain immediate access to the content and experiences of the classroom while also participating in classroom activities more effectively (Judge et al., 2008). This study supports the use of this checklist because it promotes the planning and preparation for the integration of assistive technology into the learning environment.

Few researchers have written about the benefits of iPad integration with regards to membership and participation. Runyan (2013) found that technology integration helped students access the curriculum, increased social engagement and interaction, and increased participation. Debele and Plevyak (2012) found that if teachers knew their content and integrated technology into the content areas, content delivery changed. With Mike and Billy, the integration of the iPad enhanced the curriculum resulting in positive outcomes and increased inclusion. This study thus contributes to the literature about membership and participation through the use of a tablet device given that findings suggested through the interviews and observations that iPads helped students with disabilities access the curriculum and heighten membership through increasing competency, individualized learning/differentiation, and repetition and reinforcement.

In summary, the interviews and observations of each individual case study showed that successful integration of a technology device can lead to increased membership in a classroom. As a result, the iPad allowed a student who could not initially participate to their fullest extent to now have the opportunity to increase participation and become a member of their classroom community while benefiting from the use of the iPad in multiple realms. The teachers that chose not to integrate the iPads with their students showed lower expectations for their students. Theresa and Ben, according to their IEPs, needed the iPad as a means for communication. Their teachers preferred that they communicate verbally, instead. As a result, the teachers' beliefs resulted in the non-use of the device.

To become an accessible classroom, teachers must receive the necessary resources to overcome the barriers that impede implementation. The study concluded that there are a multitude of factors affecting accessibility and integration and these factors play a vital role in how to heighten membership in the classroom and the research supports these findings.

Limitations and Areas of Further Research

There were limitations to this study that helped to bring about ideas for future research. For this study there was a specific participant pool which limited the number of participants. Out of only four participants that fit the inclusion criteria, there was a limited view of disabilities since only two out of the 13 different IDEA disability categories were represented. For future studies, researchers might want to include multiple disability categories and a larger participant pool.

Another limitation of the study was the focus on iPad technology. This study focused on how iPads affected membership and participation when it could have looked at how any piece of technology, such as other tablets, could affect these areas. iPads are only one form of technology now being used in schools, so this was a missed opportunity to involve a wide range of students. Consequently, future studies could focus on a wide range of technologies available to classrooms and students.

The last limitation revolved around the data collection period. Even though the effects of iPad use on membership and participation occurred, for Ben, there was a limited amount of observations. Also, the observation periods occurred throughout various points in the day, which could provide for skewed data on when the devices were used. For any future study, it would be beneficial to spend more time with all of the participants during the same time of the day to collect data on patterns.

Conclusion

The membership and participation opportunities for students with disabilities are critical in promoting an inclusive classroom. Providing opportunities for participation through the integration of an AT device is one way that membership can be positively affected. For this to occur, teachers need to take the initiative to integrate the devices used based on student needs. In this study, it was found that teacher beliefs ultimately affected the integration of iPads.

It is imperative that schools not only provide the needed supports and training about technology and technology integration but also work to improve teachers' beliefs. Teachers need to be willing to alter their beliefs in order to support student needs and take the time to ask themselves these questions:

- Do I believe that students with disabilities cannot succeed like my students who are not disabled?
- Do I believe that there is one right way to do something?
- Am I hesitant to integrate technology with students with disabilities in order to help them achieve their goals?
- Do I have lowered expectations for my students with disabilities?

If teachers answer “yes” to any of these questions, then schools need to address the larger issue at hand. When teacher beliefs do not align with the acceptance of student needs, then technology integration for students with disabilities will suffer. The results of this study showed that there are benefits to integrating devices successfully as well as negative effects associated with non-use or superficial use. Teachers must create a connection between their integration techniques and the needs of their students. As teachers, it is important to question individual practices and decisions, and ask the question “How can assistive technology best be used to meet the needs of the students with disabilities, thus heightening their membership and participation?”

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About the Author

Dr. Katie Heath is an associate professor at Roberts Wesleyan College in Rochester, NY. Her focus is on teaching pre-service students about special education and assistive technologies in regard to students with disabilities. She serves as the program director for the Pathway to Teaching Program, which is a degree completion program for adults looking to acquire their teaching certification. She lives in Geneva, NY with her husband and son.

Teaching Middle School Students with Disabilities to Solve Multi-Step Equations using the Hands-On Equations System

**Thomas C. Hendrickson, M.S. Ed.
Annemarie Horn, Ph.D.**

Old Dominion University

Abstract

This study utilized a one-group pretest-post-posttest design (Allen, 2017) to examine the effects of the Hands-On Equations system on students' abilities to solve multi-step equation problems following explicit classroom instruction on the skill. Participants consisted of four middle-school male students, all of whom received special education services and were educated in an inclusive general education 8th grade math class. Disability diagnoses included learning disability (LD), other health impairment (OHI), and autism spectrum disorder (ASD). All participants displayed task-initiation and completion difficulties, in addition to one student who displayed further behavioral difficulties. The intervention consisted of 24 small-group Hands-On Equations lessons focused on solving multi-step linear equations. A 10-item pre/posttest was used to evaluate participants' performance. Results showed academic growth in three of the four participants following the Hands-On Equations intervention. Our findings, in addition to implications for research and practical application are discussed.

Teaching Middle School Students with Disabilities to Solve Multi-Step Equations using the Hands-On Equations System

Introduction

The 2019 Nation's Assessment of Educational Progress reports a significant discrepancy exists in mathematics achievement between 8th grade students with disabilities and their typically developing peers. To be exact, a 40-point gap exists between the math achievement levels of 8th grade students with disabilities in comparison to their peers without disabilities (NCES, 2019). One of the concepts assessed on the 8th grade Assessment of Educational Progress is students' abilities to solve linear algebraic equations, wherein students apply a sequence of two or more steps to solve for the value of an unknown number. This multi-step algebraic skill can pose difficulty for students identified as possessing a high-incidence disability, including those with a diagnosis of a learning disability (LD) or other health impairment (OHI). Students with high-incidence disabilities are those students with highly prevalent disabilities including emotional and/or behavioral disorders, learning disabilities, and mild intellectual disabilities who are being served in public school settings (Gage et al., 2012). Students with other disabilities such as high-functioning autism, attention-deficit hyperactivity disorder, and speech and language impairments are categorized as high-incidence disabilities, as well (Gage et al., 2012). The aforementioned disability diagnoses can affect cognitive processes, such as memory, attention, language, and metacognition; thus, further impacting one's ability to solve multi-step algebraic equations and related content (Impecoven-Lind & Foegen, 2010). Bryant et al. (2000) further cited students with LD having difficulties solving multi-step mathematics problems as the second most commonly reported characteristic of students with LD who struggle with mathematics. In

addition to algebraic skills being taught and assessed in many American public schools, algebra is considered a necessary skill to acquire higher levels of abstract thinking (Witzel et al., 2003) and facilitate achievement in advanced mathematics courses, entrance into college, and equitable pay in the workforce (Impecoven-Lind & Foegen, 2010). For this reason, it is critical that students acquire algebraic skills and receive high-quality instruction which can lead to academic growth in students with and without disabilities.

The use of manipulatives is a frequently cited strategy educators can utilize in an attempt to enhance their lessons and to better facilitate the mathematical learning of students with disabilities (Boggan et al., 2010). Hands-on manipulatives are concrete, three-dimensional figures or objects such as number lines, coins, geometric figures, algebra tiles, and number cubes used to create an external representation of a mathematical idea (Puchner et al., 2008). In addition to manipulatives representing mathematical problems, ideas, and situations, their use should further seek to transfer mathematical concepts from concrete to abstract levels of understanding (Tournaki et al., 2008). The National Council for Teachers of Mathematics, as well as the IRIS Center at Vanderbilt University have cited the use of math manipulatives as being a valuable tool in representing mathematical concepts (NCTM, 2014; IRIS Center, 2010, 2017 rev.), as well as a tool utilized by students to further their understanding of the concepts behind various mathematical topics. Despite various entities supporting the use of manipulatives to teach math concepts, questions regarding the actual effectiveness of this practice and its impacts on student outcomes exist. Carbonneau et al. (2013) conducted a meta-analysis of 55 studies that compared mathematics instruction with the use of math manipulatives to mathematics instruction provided with only abstract math symbols. Through this meta-analysis, inconsistencies emerged regarding the effect that using manipulatives to teach various mathematical concepts had on overall student learning. Of the 55 studies in the meta-analysis, two studies focused solely on teaching students with LD with the use manipulatives. Butler et al. (2003) and Peterson et al. (1988) (as cited by Carbonneau et al., 2013) found incorporating math manipulatives to result in improved learning outcomes in students with disabilities across various mathematical concepts. Further, Carbonneau et al., 2013 also highlighted the fact that there was a small to medium effect on student learning with the use of manipulatives compared to instruction that did not use manipulatives on the general population of students. Despite the two studies indicating manipulatives being beneficial to students with LD in mathematics, these two studies only accounted for 3.6% of the studies considered in the meta-analysis and did not make up a significant body of supporting literature. Support of the use of math manipulatives from different entities compared to minimal overall findings by Carbonneau et al. regarding the effectiveness of math manipulatives as an educational practice indicates a need for added research to contribute to the inconsistent body of literature that exists regarding this educational practice.

Hands-On Equations System

One math manipulative tool developed to provide students with a concrete and pictorial introduction to algebraic linear equations is the Hands-On Equations system (Borenson & Associates, Inc., 2019). Developed in 1986 by Dr. Henry Borenson, the Hands-On Equations system is a system comprised of pawns, number cubes, and a mat depicting a balance beam, upon which students model linear algebraic equations. After modeling an equation (pawns representing variables, number cubes representing integers, and the center of the balance beam

representing the equals sign) students proceed to simplify the equation by physically manipulating the pawns and number cubes. Consequently, either the solution to the linear equation, or a simplified equation requiring only one basic and final computational step to yield the value of the variable. According to the 2008 Hands-On Equations Interim Report conducted by Borenson and Barber (2008), 243 middle-school students in inner-city schools displayed statistically significant gains in their abilities to solve multi-step equations after completing the first seven lessons of the Hands-On Equations system. However, participant ability levels were unclear and described as follows, “by state standards considered low achieving and by district standards considered average” (Borenson & Barber, 2008). This study could be considered “in-house”, and there is not a significant body of research regarding this one specific system for teaching algebraic concepts; thus, further studies would be necessary to identify the effects of the Hands-On Equations system. Despite the lack of a significant body of research supporting this particular strategy, this strategy specifically targets the solving of linear algebraic equations, making it unique and relevant to a specific mathematics skill. The Hands-On Equations system not only stands alone as a learning platform that relies on manipulatives to teach students, but further teaches students how to transfer the concrete system into a pictorial, representational system that can be employed in the absence of the manipulatives.

The purpose of this study was to answer the following research question: what effect, if any, will the Hands-On Equations math manipulatives system have on four 8th grade students identified as having a high-incidence disability, and who demonstrated difficulties with solving multi-step linear equations in an inclusion math class setting per pre- and initial post-test data? Students identified as having a high-incidence disability and who received instruction in an inclusion pre-algebra 8 classroom completed twenty-four Hands-On Equations lessons and then were assessed on their ability to complete multi-step linear equations problems, reflective of their state’s learning standards for solving multi-step linear equations. This study was further relevant for these students, as in addition to the aforementioned importance of algebraic thinking and abilities that will serve them later in their academic careers, this sample of students encountered multi-step equations on a state standardized mathematics assessment at the end of the 2019-2020 school year.

Method

Participants

Four eighth-grade students (ages 13-14) enrolled in a suburban public middle school participated in this study. All participants spent at least 75% of their school day in a general education classroom and received at least 75% of their special education and related services in that environment. Detailed participant demographic information is presented in Table 1. All four participants were in eighth-grade at the time of the study, enrolled in an inclusive pre-algebra math class, and received special education services in the area of mathematics for at least 150 minutes per week. Michael, Andy, Gerard, and Pete all had a high-incidence disability; yet, as shown in Table 2, there were differences in specific disability diagnoses that qualified them to receive special education services under the Individuals with Disabilities Education Improvement Act (IDEA). We assigned pseudonyms to maintain the anonymity of participants.

Table 1

Participant Demographics

Participant	Gender	Age	Ethnicity	Grade
Michael	M	14.2 years	African-American	8
Andy	M	13.11 years	African-American	8
Gerard	M	14.11 years	Caucasian	8
Pete	M	14.2 years	Caucasian	8

Prior to and throughout the intervention, each participant received 55 minutes of daily mathematics instruction in a collaborative, inclusion classroom setting served by one general-education teacher and one special education teacher. In addition to traditional general curriculum math instruction, all four participants received special education academic supports in their math classes. Gerard, Andy, and Pete all received behavioral skills supports in the general education classroom, as well. Table 2 below illustrates Michael, Andy, and Gerard's abilities in the areas of Math Computation and Mathematical Applications (respectively), as indicated by educational evaluation data available for these three participants (Pete had not completed any educational evaluations at the time of this study). Table 2 further illustrates each participants' identified disability category or categories, as well as the number of years they had been receiving special education services at the time of this study.

In addition to individual disability diagnoses and demonstrated abilities in math computation and mathematical applications, Michael and Pete both displayed difficulties with their working memory skills, both falling in the below average range as indicated by results of the Weschler Intelligence Scale for Children-Fourth Edition (Pete) and the Weschler Intelligence Scale for Children-Fifth Edition (Michael). These difficulties with working memory skills could directly affect both participants' performance in mathematics, as there has been a connection between student working memory skills and mathematical skills attainment (Holmes & Adams, 2006). All four participants in this study struggled with task completion, and were frequently unmotivated or unwilling to complete daily classroom assignments and tasks. Gerard demonstrated further disruptive behaviors in the classroom that interfered with his learning and the learning of other students, such as verbal aggression towards peers, making rude and inappropriate comments during instruction, and fidgeting.

The participants all met the following criteria to be included in this study: (a) 8th grade student who is taught by the co-investigator, (b) student is identified as having a disability that falls under the high-incidence disability umbrella (e.g., LD, OHI, and/or Autism) and is currently receiving special education services, (c) student obtained a score lower than 60% on the initial multi-step equations unit posttest.

Table 2

Special Education Services & Mathematics Achievement

Participant	Years in SPED	Disability Diagnosis	Assessment	Math Performance
Michael	6	SLD & OHI	KTEA-III	Low; Below Average
Andy	3.5	OHI	KTEA-III	Average; Below Average
Gerard	4	OHI	KTEA-III	Below Average; Average
Pete	5	Autism	Not Available	Not Available

Setting

All intervention sessions took place in a resource room setting that was adjacent to the inclusion classroom during participants' Academic Enrichment Period (AEP), which is a thirty-minute period all students can utilize to do homework, make up assignments/assessments, and receive academic remediation. During this period, all four participants met their inclusion special education teacher in a resource room type setting to engage in intervention sessions. Intervention sessions did not replace traditional math instruction provided in the general education classroom; rather, participants received grade-level direct instruction in their typical math class and intervention sessions followed during their scheduled AEP period.

Structure of Lessons

The Hands-On Equations System is comprised of twenty-six total lessons, one of which is optional (lesson #26). Of the 26 lessons, two were not included in this study. Lesson #17 focused on basic operations with positive and negative integers and was excluded due to students being allowed to utilize calculators to perform basic operations with positive and negative integers, per state curriculum guidelines (VDOE, 2017). Lesson #26 was excluded, as well, as it was optional.

The various Hands-On Equations lessons are divided into three different levels, with each level focusing on a different applied linear equations concept. The level one set of lessons, or lessons #1-#7, focused on students performing operations with positive coefficients and positive integers. The level two set of lessons, comprised of lessons #8-#17, introduced operations with negative coefficients. The level three set of lessons, or lessons #17-25, introduced operations with positive and negative coefficients, and positive and negative integers. Each of the three levels of lessons included problems requiring students apply the distributive property, solve problems with one variable in the equation, and solve problems with variables on both sides of the equation. Table 3 further illustrates the specific lesson skills/themes.

Table 3

Structure of Hands-On Equations System and Lessons

Lesson Number	Lesson Skill/Theme
1	Setting up basic equations/solving by trial and error
2	Blue pawn represents "x" or a variable
3	Setting up equations with variables on both sides of equals sign/balance beam
4	Opposite operations with positive integers
5	Subtracting blue pawns from original physical setup
6	Solve equations using distribution
7	Transfer of concrete manipulatives to a pictorial, representational system
8	Introduction of the "star symbol" and white pawns, which represent negative variables.
9	Students learn that blue and white pawns represent opposite values
10	Operations with positive and negative integers on same side of equation

11	Students learn that pairs of opposite pawns can be added to either side of equation/setup
12	Variation of lesson #11
13	Operations with positive integers on both sides of equation and +/- variables on both sides
14	Addition of a “convenient zero” or subtracting negative variables
15	Students learn to acknowledge the “-x” symbol as the star symbol, or white pawn.
16	Transfer of concrete manipulatives to a pictorial, representational system.
17	Basic operations with positive and negative integers (This lesson was skipped)
18	Solving basic equations with a green cube, representative of negative integers
19	Notion of adding a “convenient zero” to equations with a negative integer
20	Solving equations with +/- integers, as well as pawns of one color on both sides of equations
21	Solving equations with +/- integers and blue & white pawns
22	Solving equations with +/- integers and blue & white pawns with distribution
23	Subtraction of an expression after distribution
24	Students use +/- integers and blue & white pawns to solve equations with the “-x” symbol.
25	Transfer of concrete manipulatives to a pictorial, representational system
26	Optional lesson. Students transfer pictorial system to a “traditional” written solution system

Data Collection

Data collection consisted of pretest data being collected prior to students beginning a classroom unit on multi-step equations. In this study, the dependent variable was student performance on the second posttest after participating in the intervention; the independent variable was the implementation of the Hands-On Equations intervention in a small group setting.

Materials

Hands-on equations kits. Each participant was provided with a Hands-On Equations kit comprised of the following components: a laminated mat with a depiction of a balance beam on it, a set of red number cubes for representing positive integers, a set of blue number cubes for representing negative integers, a set of blue pawns to represent positive variables, and a set of white pawns to represent negative variables. Participants were also provided with a magic marker and eraser to utilize when working problems out on their mats.

Hands-on equations practice worksheets. After the modeling phase of each lesson, participants completed practice worksheets designed by the makers of the Hands-On Equations system, with questions pertinent to the lesson number they had completed, as well as questions from previous lessons, which allowed participants to review and practice previously learned skills.

Calculators. All four participants were provided with a scientific calculator to utilize during practice sessions, as well as on the pre-test, post-test, and post-intervention tests. Of the four participants, three were allowed the use of a calculator on all math assignments and math assessments through their Individualized Education Programs. However, all 8th grade Virginia Standards of Learning units in mathematics allowed for the use of a scientific calculator (VDOE, 2017). Overall, the scientific calculators served as a supplement to aid students on the basic computations they conducted on the practice sheets and post-intervention test, and could not be utilized as the sole means of solving the multi-step equations.

Procedural Fidelity

Procedural fidelity was maintained throughout the implementation of the intervention by following the three guidebooks that accompanied the Hands-On Equations kit. These guidebooks were written by the creator of the Hands-On Equations system and provided educators with the appropriate sequence of steps necessary to teach the individual lessons. The guidebooks also provided visual examples of the skill(s) taught in each lesson (Borenson, 2008).

General Procedures

Following the collection of pre-test data, students received classroom instruction on solving multi-step algebraic equations. Each of the fifteen classroom lessons followed an explicit instruction model. Participants received classroom accommodations and supports as outlined in their Individualized Education Plans through supports from both the special education teacher and the general education teacher. The fifteen direct-instruction lessons consisted of a warm up, homework review, lecture/notes, guided practice, and independent practice structure where the skills necessary to solve multi-step equations, relative to state learning requirements, were taught. At the conclusion of these lessons, students were administered the initial posttest, which allowed for the selection of study participants. After participants were selected, the intervention began being implemented. After twenty-four, thirty-minute long sessions, which covered twenty-four of the Hands-On Equations lessons, students were administered the final posttest to measure their overall performance on solving multi-step equations.

Experimental Design

This study utilized a one-group pretest-post-posttest design (Allen, 2017) to measure the effects of the Hands-On Equations system on student abilities to solve multi-step equation problems.

Pretest (Baseline)

Students were administered a five-question pretest to gauge what they already knew about solving multi-step equations prior to starting a unit on the skill. Questions covered skills including error analysis of solving a multi-step equation, solving multistep equations with variables on both sides with both positive and negative variables and positive and negative integers, and solving an equation with distribution with positive and negative integers and positive and negative variables. This pretest provided baseline data by which to measure student progress following classroom instruction on the topic.

Posttest

After students completed the fifteen lessons on solving multi-step equations, the initial posttest assessment to measure their learning was administered. The initial posttest assessment was comprised of ten questions, two of which were free response and eight of which were multiple choice. Each of the skills addressed on the posttest reflected skills required by the participants' state directed learning standards requirements for eighth-grade students. Table 4 below shows the structure of both posttest assessments with the skills assessed. This initial posttest data partially provided the basis upon which students were selected to participate in this study.

Table 4

Structure of Initial Posttest and Intervention Posttest Assessments

Question	Response Format	Skill Assessed
1	Multiple-Choice	Combining Like-Terms
2	Multiple-Choice	Identify the first step to solving a given multi-step equation
3	Multiple-Choice	Identify the first step to solving a given multi-step equation
4	Multiple-Choice	Solve an equation with one (-) variable and one (-) integer
5	Multiple-Choice	Solve an equation requiring distribution with (+) variables and integers
6	Multiple-Choice	Solve an equation with (-) variables and (+/-) integers on both sides
7	Multiple-Choice	Solve an equation by combining like (+/-) terms & (+) variables
8	Multiple-Choice	Solve by combining (+/-) variables and (+) integers on both sides of equation
9	Free-Response	Translate a visual representation of an equation and solve it.
10	Free-Response	Translate a visual representation of an equation and solve it.

Posttest- The posttest was structured in a similar fashion to the initial posttest administered to students, addressing the same skills required by the state learning standards. It was comprised of ten-questions, two of which were free response and eight of which were multiple-choice.

Training- Participants were taught as a group during a total of twenty-four, thirty-minute long sessions; these sessions occurred during the participants' AEP. Training sessions were comprised of each Hands-On Equations lesson being modeled and explained for participants on an overhead camera, per instructions in the Hands-On Equations Learning System guidebooks. Following modeling and guided practice, participants completed independent practice utilizing the Hands-On Equations worksheets. Participant responses were checked for accuracy, and they then received explicit feedback on their work and further remedial instruction individually if a response was incorrect. Of the twenty-four sessions offered to participants, Gerard missed two sessions due to out-of-school suspensions, and Pete missed three sessions due to other absences. Michael and Andy were present for all twenty-four sessions.

Results

Figure 1 depicts participant assessment data across three conditions. The first column shows performance prior to instruction on multi-step linear equations. The second column depicts performance on the end of unit assessment which followed whole-group instruction in the general education classroom setting. Finally, the third column reveals participant assessment data following introduction of the independent variable. To draw conclusions about the Hands-On Equations intervention, we compared pre- and post-treatment assessment data. We also analyzed

student assessment data prior to any exposure of content-specific information. Three of the four participants showed progress following the completion of the twenty-four Hands-On Equations lessons, whereas one participant's data remained stable (i.e., no change in performance was observed).

Michael's growth during the whole class instruction phase was 10%, and improved by 20% following the Hands-On Equations intervention. Gerard's growth during the whole class instruction phase was 20%, and his performance increased by an additional 20% following the intervention. Pete's growth during the whole class instruction phase was 50%, and following the Hands-On Equations intervention, assessment data revealed an additional 10% growth. Andy's assessment prior to any instruction was the highest, at 20%. His performance increased by 20% as a result of the whole class instruction, yet his assessment data plateaued between pre- and post-intervention conditions.

While three of the four participants showed improved assessment scores between pre- and post-treatment conditions, they did not establish mastery in completing multi-step linear equations as a result of the Hands-On Equations intervention. To draw these conclusions, a One-Way ANOVA was conducted comparing the means of the different assessments given. The analysis of variance across the means indicated that all four participants had equal distributions of mean scores, and none made any statistically significant gains in their performance.

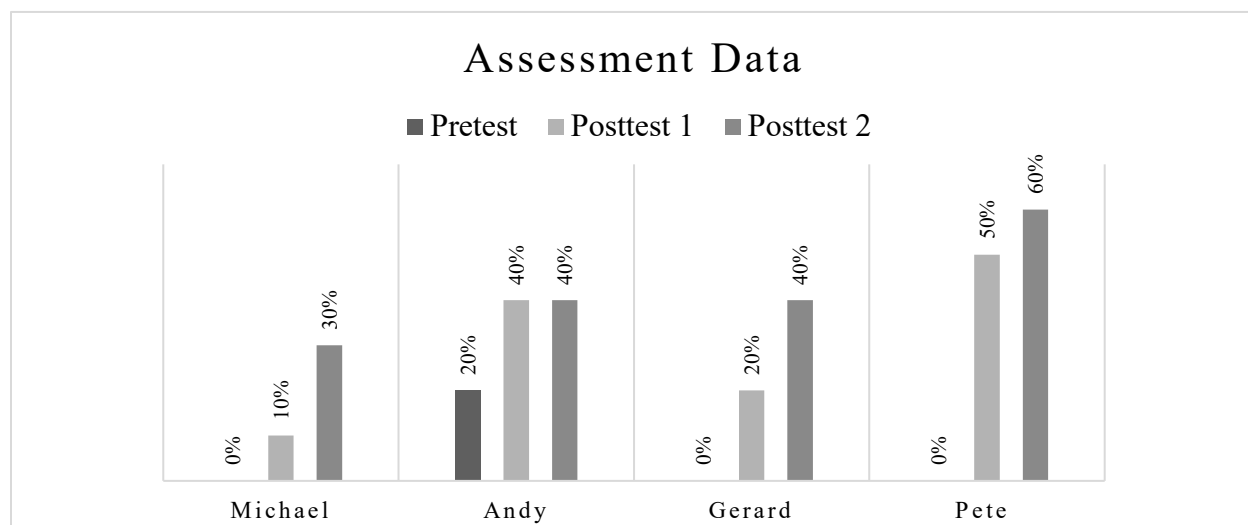


Figure 1: *Pre and Posttest Assessment Data*

Note. Pretest data represent performance prior to traditional instruction; Posttest 1 represents performance following traditional instruction, prior to intervention; Posttest 2 represents performance following the Hands-On Equations intervention.

Discussion

This investigation measured the effects of the Hands-On Equations system on acquisition of multi-step linear equations in four eighth-grade participants with disabilities. The results of this study showed the intervention to result in student growth in three of the four participants, as measured by pre- and post-assessment data. However, none of the participants reached a level of mastery (i.e., scoring 80% or higher on the posttest assessment) in completing multi-step linear equations as a result of this intervention. These data revealing no statistical significance were inconsistent with the investigation conducted by Borenson and Barber (2008), which found participants to make statistically significant gains in their math performance as a result of a Hands-On Equations intervention. However, it should be noted that Borenson and Barber's study had a different sample of participants with differing abilities compared to this study and only implemented the first 7 lessons in the Hands-On Equations system. Students in our study faced several academic and behavioral hardships, which may have affected their response to the Hands-On Equations intervention. Lack of motivation and noncompliance when presented with academic tasks were observed frequently in study participants. Additionally, interruptions, such as poor attendance affected consistent treatment implementation throughout this investigation. Due to a pep-rally and grade-level assembly occurring during two AEP periods, a week where three of the four study participants were absent for the entire week due to illness, as well as several participants needing to be tested during their AEP on other occasions, it was not possible to consecutively conduct all twenty-four sessions on a daily basis. This lack of a consistent delivery of the twenty-four lessons, despite reviewing previously learned skills during sessions, may have had a detrimental effect on participant response to the intervention. This factor could be further avoided in future studies by implementing the intervention during a more structured instructional period, such as in a daily instructional pullout type group.

Limitations

While interpreting the results of this study, there are several limitations to take into consideration. First, this study included a small sample size of four students, all of whom were 8th grade males with a high-incidence disability. Therefore, generalizing these findings to students with other disability diagnoses, or other ages and genders is a limitation to our investigation. Second, the participants each individually displayed varying levels of difficulties with task completion and a general unwillingness to initiate and complete tasks across academic settings and curriculum areas. Participants required frequent prompts during lessons to initiate problems and to apply what they had been taught in each of the Hands-On Equations lessons. Participants also required frequent prompts during lessons to draw a visual representation of the Hands-On Equations system to aid in their problem solving. In addition to difficulties with task initiation and completion, Gerard displayed frequent off-task and disruptive behaviors during sessions, such as making comments at inappropriate times, attempting to talk to peers, and playing with items found in his general vicinity. Generalizing these findings to other students with high-incidence disabilities who do not engage in noncompliant and disruptive behaviors is another study limitation. Third, inclusionary criteria being exclusive to students who did not demonstrate success in completing multi-step linear equations after traditional, whole class instruction is another limitation of this investigation. While significant student growth was not observed as a result of the Hands-On Equations intervention in our study, students without previous content-specific challenges may yield different results. Despite the aforementioned

limitations, the results of the present investigation contribute to the limited body of research on the Hands-On Equations strategy and lend recommendations for further research and practical application.

Implications for Research

To fully examine the benefits of the Hands-On Equations system as an intervention and validate the procedure, further research should be conducted examining students at different grade- and ability levels. Further, we recommend measuring the effects of the Hands-On Equations system with a larger sample size and using this procedure as an initial measure of skill acquisition when assessing multi-step linear equations. Finally, we recommend future research with appropriate methodology to include students who display different task initiation and completion abilities, as well as students who are receiving special education services under different disability diagnoses.

Implications for Practice

The use of the Hands-On Equations system, as well as other manipulatives to teach mathematical concepts, have merit and could help students acquire skills necessary to solve algebraic equations. As evidenced by participants generating and further utilizing a representational model of multi-step equation problems on the final posttest, participants acquired a representational strategy to utilize through the Hands-On Equations lessons. This can be an invaluable strategy for students to have in their repertoire by which to approach solving multi-step algebraic problems. In lieu of solely teaching students how to solve multi-step linear algebraic equations with the Hands-On Equations system, the system can be used to supplement explicitly delivered instruction and provide concrete and representational models of algebraic equations. For example, a lesson on solving a multi-step equation could be initially set up using the Hands-On Equations kits and further solved by manipulating the number cubes and pawns. After this concrete representation, the lesson could immediately move into teaching abstract methods of solving the equation.

In place of teaching the Hands-On Equations system in parallel with traditional methods of solving multi-step equations, the system can be integrated into later explicit instruction. Once students have a grasp on the traditional methods of solving equations, the Hands-On Equations system can provide students with a more concrete representation of how to set up and solve multi-step equations. That is, once students have learned the abstract skills necessary to solve multi-step equations, the Hands-On Equations system can be taught as a series of stand-alone lessons to supplement and reinforce previously taught skills. The Hands-On Equations system can also be taught in parallel in a resource or pullout type classroom setting, in addition to the explicit instruction students receive in the general education classroom on solving multi-step equations. To better mirror Borenson & Barber's 2008 findings, it may be appropriate to only incorporate or provide students with instruction on the first 7 lessons of the Hands-On Equations system, to introduce the basic underlying skills necessary to solve multi-step equations, as well as to serve as a "buffer" for more advanced multi-step equation problems.

Conclusion

Many students with disabilities struggle solving algebraic equations. Nonetheless, becoming proficient in mathematics, namely algebra, is critical to their future academic and individual successes. Using the Hand-On Equations system to teach multi-step linear equations has demonstrated some merits in helping students with disabilities further achieve proficiency in mathematics. Although the findings of this study did not yield statistically significant results in regards to improvements in participant performance, 3 out of the 4 participants did demonstrate growth in their abilities to independently solve multi-step linear algebraic equations; one student showed neither regression nor progression following the Hands-On Equations lessons. This sample of participants represented students with various academic and behavioral difficulties, as well; despite these difficulties, three of four participants made progress, and more importantly, all students were voluntary participants in an extra academic task; i.e., it was stressed to participants that they had a choice to partake in sessions. Based on these present findings coupled with those by Borenson & Barber (2008), it is plausible to suggest that the Hands-On Equations system is a viable educational tool to use in conjunction with teaching multi-step linear equations following an explicit instruction model.

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About the Authors

Thomas C. Hendrickson, M.S. Ed., is a recent graduate of the Master's in Special Education program with Research Emphasis at Old Dominion University in Norfolk, VA. He is currently in his sixth year as a special education inclusion math teacher at a middle school in eastern Virginia. His interests include mathematics education of students with high incidence disabilities, STEM education of students with disabilities, and instruction of students with behavioral disorders.

Annemarie L. Horn, Ph.D. is an assistant professor in the Department of Communication Disorders and Special Education at Old Dominion University. She is a former special education teacher with experience teaching in inclusive and more restrictive settings at both the elementary

and secondary levels. Dr. Horn's research interests include teacher training and coaching, as well as increasing the application of evidence-based practice.

The Impact of a Community-University Partnership Program on Special Education Teacher Training in Autism Spectrum Disorder

Emily R. Shamash, Ed.D.

Alyson M. Martin, Ed.D.

Fairfield University

Abstract

The need for highly qualified teachers who have experience and training with students with ASD continues to grow. In order to meet the need for high quality supervised field experiences for teacher candidates as well as opportunities for students with ASD to gain exposure to post-secondary activities on a University campus, the Transition Opportunities for Post-Secondary Success (TOPS) program was launched. This program offered a unique opportunity for both undergraduate and graduate pre-service regular and special educators to gain hands-on practical experience teaching students with ASD under the guidance of highly qualified special educators. Assisting in the TOPS program offered practical experiences that mirrored theoretical and practical approaches taught in the higher education classroom. Survey data was collected on the TOPS assistant experiences with regard to the impact on their future professional interest in special education and ASD and the overall perceived value of the training. A synthesis of results and next steps for research and practice are discussed.

Keywords: community-university partnership, special education teacher training, transition program, autism spectrum disorder)

The Impact of a Community-University Partnership Program on Special Education Teacher Training in Autism Spectrum Disorder

According to the Centers for Disease Control and Prevention (CDC), 1/54 individuals have been identified as having Autism Spectrum Disorder (ASD) (CDC, 2020). Therefore, supervised teacher training to educate students with ASD is essential for all educators. There is a need for highly qualified teachers who have experience and training with students with ASD (Loiacono & Allen, 2008; Loiacono & Valenti, 2010). However, it is well documented that the field of Special Education continues to face a critical shortage of teachers across the United States (Dewey et al., 2017). Not only is there a need for highly qualified and effective special education teachers in public schools, strong preparation of special educators is a necessity (Hart & Malian, 2013).

While the need for hands-on supervised training is relevant across all grades and ability areas, researchers have found that there is a salient need for special educators who have the desire and skills to teach students with ASD (Loiacono & Valenti, 2010). It is insufficient to simply grow the number of certified special education teachers to fulfill these vacant positions. It must be a national goal to prepare well-trained and experienced teachers who have supervised opportunities teaching students with ASD prior to entering the field. This will assist to adequately prepare new teachers to the complexities and challenges of working with individuals with ASD and their families. While studying the theory behind evidence based practices for

students with ASD is imperative for special educators, the application of these methodologies under supervised mentor teachers and professionals is equally essential to quality teacher education (Hart & Malian, 2013).

In order to discuss how teacher candidates can be adequately prepared to teach students with ASD, it is important to first mention the special education teacher preparation guidelines. Preparing special educators predominantly involves the successful completion of a state approved Educator Preparation Program (EPP) leading to certification. Field observations in school and agency settings for students with disabilities as well as student teaching/practica hours are central to teacher education and training required across all approved EPPs (Nagro & deBettencourt, 2017). While the Council for Exceptional Children (CEC), the professional association for special educators, recommends direct field experience for pre-service special educators in a range of settings, abilities and age groups, they do not mandate the number of hours required across programs. Each state department of education specifies the educator preparation regulatory requirements across all teacher certifications, yet they also do not specify the number of hours and ways in which the EPPs must implement these statutes (Barnhill et al., 2010). This leaves options and decisions on how to best prepare teacher candidates to work with students with ASD up to the EPP.

Throughout the United States, EPPs maintain flexibility with the ways they choose to meet state requirements, yet they share the primary goal of offering high quality instruction and training to teacher candidates. As a result, supervised field hours and requirements vary widely across preparation programs. It is important to note that researchers have found that direct field experience for pre-service educators includes working directly with students. More specifically, supervised field experiences are among the most crucial learning experiences within teacher preparation programs (Nagro & deBettencourt, 2017). Supervised field experiences offer opportunities to engage in real-time problem solving methods, active engagement, application of evidence based practices and professional dispositions, all under the supervision of a certified educator and experienced mentor. Teacher candidates must engage in supervised learning experiences that involve diverse settings as well as working with a range of students with regard to ability, gender, language, race and class (The Council for Exceptional Children's Standard Framing Paper Workgroup, 2017).

An additional issue that impacts special education preparation program design includes that some states (e.g. Connecticut), offer a comprehensive certification in Kindergarten - 12th grade. Even with well-designed and versatile teacher preparation programs, there is no gold standard by which to design a preparation program that leaves candidates well-equipped to gain employment across K-12 learning environments. Providing candidates with supervised field work covering the broad range of ages and disability categories and diagnoses, as well as, offering a range of training experiences in diverse settings is an ongoing challenge for EPPs (Sindelar, Brownell, & Billingsley, 2010).

One of the ways in which EPPs can address the need for high quality supervised field experiences for special education teacher candidates, is by offering peer modeling opportunities in University settings. These kinds of programs can benefit both students with ASD and peer mentors interested in entering the field of special education. Offering experiences to teens and

young adults with ASD in higher education settings is a growing trend with the enactment of the Higher Education Opportunities Act in 2008, it is recognized as an ideal setting for postsecondary learning (Kleinert et al., 2012). Siew et al., (2017) looked at a peer mentoring program for students with ASD on a college campus. They found that students with ASD experienced increased social support and positive impact in the area of communication skills as a result of participating in such a program. While studies (Kleinert et al., 2012, Siew et al., 2017) have investigated peer mentoring for students with ASD enrolled in University courses, few have investigated the impact on same-aged peers without disabilities. University programs who are committed to the dual goal of exposing students with ASD to a University campus and pre-service educators and undergraduate students to working with adolescents with ASD is not yet common practice.

In order to meet the need of accessible high quality supervised field experiences for teacher candidates as well as opportunities for students with ASD to gain exposure to post-secondary activities on a University campus, the Transition Opportunities for Post-Secondary Success (TOPS) program was launched. This program offers a unique opportunity for both undergraduate and graduate pre-service general and special educators to gain hands-on practical experience teaching students with ASD under the guidance and supervision of highly qualified special educators (Martin & Shamash, 2020).

Current Program Model

A team comprised of faculty members from the Special Education Program at Fairfield University and Special Education graduate and undergraduate students from various majors, as well as, senior staff from The Kennedy Center's Autism Project partnered and co-led the development, implementation and assessment of this community-based social activity group, Transition Opportunities for Post-Secondary Success (TOPS). This group was established through a collaborative University and agency partnership in order to explore a new transition paradigm for young adults ages 18 to 23 of the greater Bridgeport, Connecticut area with high functioning ASD. Collaboratively, each stakeholder contributed to the various needs of the program. The partnership offered graduate students in special education pre-service programs and undergraduate students in educational studies minor programs the opportunity to gain field experience on the University campus. The program began with a pilot year in 2017-2018 and is currently in process as an evolving and continuing program on campus.

Program Overview

Background and Program Initiation

The Kennedy Center, a local non-profit organization that supports children and adults with developmental disabilities, indicated a need for an innovative transition program to support significant improvement in the development of critical life skills among young adults with ASD on a University campus. The Kennedy Center approached Fairfield University to discuss the development of a post-secondary preparation program for teens and young adults with ASD. Concurrently, based on feedback from graduate students enrolled in the Fairfield University's Special Education Program, it had been noted that pre-service special educators were provided limited exposure and training in the area of transition services and hands-on experiences working with students with ASD who are of transition age. After numerous discussions and planning

sessions, the TOPS program was created by faculty from Fairfield University's Graduate Special Education Program and administrators from The Kennedy Center to meet the needs that both partners deemed mutually beneficial. The program aimed to address a multitude of social challenges and independent living skills for young adults with ASD in order to provide opportunities to practice self-empowerment, independence and problem solving skills in an inclusive University setting. Building positive social interactions among peers in the TOPS group and students on campus was central to the program. Each stakeholder contributed to the various needs of the program. Fairfield University focused on pre and post-assessment, data collection, consultation on program development and refinement, and logistical support. The Kennedy Center led recruitment of individuals with ASD and consistent communication with families. Both Fairfield University and The Kennedy Center collaborated on curriculum development, implementation and evaluation. Finally, Fairfield University offered graduate students in special education and undergraduate education minors to serve as assistants (Martin & Shamash, 2020).

TOPS Program Assistants

Recruiting

Assistants were recruited in one of two ways. First, at the start of each semester in two graduate level special education courses; SE 410: *Introduction to Teaching Students with Autism Spectrum Disorder* (Fall semester); and SE 411: *Introduction to Teaching Students with Intellectual Disabilities* (Spring semester), an invitation was extended to all students enrolled in each course. This opportunity was offered in order to fulfill course field requirements by assisting in the TOPS program. Second, an email blast was sent out prior to each fall and spring semester to all undergraduate students who declared the educational studies minor. Undergraduates who replied with interest and schedule availability were provided a first come, first serve opportunity to assist in the program. Acceptance was based on availability, interest, and ability to consistently attend TOPS sessions throughout the semester. Once the assistants were established, they were provided an introduction to the program, as well as a brief training session led by the faculty leaders prior to attending the first TOPS session. Table 1 presents key demographics for the TOPS assistants.

Roles

The primary role of the assistants was to serve as peer models for the TOPS participants. During each session, assistants provided 1:1 guidance and support when necessary, participated in role playing activities and accompanied participants on all outings on and off campus. They served as catalysts for social interaction and aimed to foster positive peer relationships in an inclusive setting. In some cases, the assistants co-planned lessons with the facilitators.

Learning opportunities

Assisting in the TOPS program offered practical experiences that mirror both theory and practical approaches taught in the higher education classroom with the traditionally underserved population of students with ASD who were transitioning to post-secondary activities. While the primary role of the assistants was to serve as role models and offer assistance to participants, they served a dual role as assistants and learners. Assistants observed faculty members and agency facilitators lead lessons on topics including gaining independence, advocacy, self-management, empowerment, self-care, resume writing, interview skills, and

campus safety. Table 2 displays specific examples of activities and assistant roles throughout the program.

Table 1
Summary of key demographics for TOPS assistants (N=15)

Age	18-22	22-32
	5	10
Gender	Male	Female
	1	14
Graduate	10	
Undergraduate	5	
No prior ASD experience (educational and/or non- educational setting)	3	
Prior ASD experience (non- educational setting)	10	
Prior ASD experience (educational setting)	2	
Prior ASD experience (educational setting: leadership role)	0	

Table 2

Example activities and assistant roles

TOPS Activity	Activity Description	Assistant Role	Teaching Practice
Semester Goals	Participants select from an array of personal goals for the semester. Examples include: 1. <i>During TOPS I will ask for help at least one time when needed.</i> 2. <i>During TOPS I will make at least one comment to a friend.</i> 3. <i>After an activity/trip I will remember at least two facts about the trip/activity.</i>	-Read list of goals -Help with selecting goal -Completing google doc goal tracking sheet in computer lab	-Least to most method of prompting -Guiding keyboard and computer skills -Implementing positive reinforcement
Interview Practice	-Participants practice job interview skills in a classroom setting	-Role play with TOPS participants in dyads -Modify example questions as needed	-Model appropriate responses -Practice reciprocal conversation skills
Campus Bookstore	-Visit campus bookstore to purchase organizational supplies	-Assist in using campus map -Guide participants to select supplies on prewritten list -Model on campus expected behaviors -Assist with money skills	-Least to most method of prompting -Teach money/budget skills
Health Center	-Visit campus health center to meet with staff and learn about hygiene practices	-Accompany participants to the health center for an inclusive lesson with nurses/staff	-Reinforce hygiene skills -Guide health-based discussions and problem solving skills

Cafeteria	-Visit cafeteria to sample food service jobs and eat dinner	-Model expected behaviors in cafeteria -Guide participants towards healthy choices -Model social skills with peers	-Practice reciprocal discussions -Teach choice making and social expectations for setting -Model sensory and calming strategies
Campus Safety	-Visit campus safety to meet with officers and learn safety skills	-Accompany participants to the office of campus safety for a tour and to learn safety tips -Prompt participant questions and answers	-Guide safety- based discussions and problem solving skills -Facilitate recall of safety tips

*Level of assistance varies depending on TOPS participant needs

Research Questions

- 1) Does assisting in the TOPS program impact the TOPS assistants' view and interest in the field of special education and ASD? If yes, how?
- 2) What do TOPS assistants report out about their experience in the TOPS program?

Method

All assistants were asked to complete an anonymous researcher designed survey at the end of the semester. Fifteen assistants completed the survey over a period of two academic years (four semesters). The survey questions and format remained unchanged across all semesters. At the end of each semester, TOPS assistants were emailed a survey using Google forms. The survey asked questions about professional interests and experience assisting in the TOPS program. Examples of questions included: *Have you worked with students with Autism Spectrum Disorder (ASD) prior to this experience? Why were you interested in participating in the (TOPS) program?* and *How did this exposure impact you?* A complete list of survey questions can be found in Table 3.

Results

This study used a survey design utilizing an online researcher- designed survey. Graduate and undergraduate students assisting in a semester-long weekly class for teens and young adults with ASD completed the survey. The majority of TOPS assistants had little prior teaching experience with students with ASD (see Table 1). The assistants who did have some experience in summer camps or other environments did not have experience working with the post-secondary age

group. Therefore, all assistants had minimal experience and none had formal training. Some assistants had other experiences prior such as a family member with ASD or participated in a Best Buddies program. Participation was voluntary and assistants were recruited from education preparatory programs. Therefore, it is not surprising that the majority of assistants reported interest in gaining experience with students with ASD, as this was the focus of their professional training by choice. As a result of assisting in the TOPS program, assistants reported they learned more about ASD, gained confidence working with students with ASD, found it a rewarding experience and mentioned that it confirmed their decision to enter a career in special education. Additionally, assistants reported gaining behavior management skills. The majority of assistants reported they formed relationships with participants and enjoyed seeing them make progress with their skills in the program. Assistants reported being surprised by the following: the connections they formed with participants, learning from the participants, level of enjoyment, difficulty for students with ASD in post-secondary activities, and the practical lessons that were implemented. All students agreed they would assist in the program again if provided the opportunity and all but three assistants reported having a plan to work with students with disabilities in their future career. Overall themes among the results included; gaining direct experience with participants with ASD, forming meaningful connections with participants, and career clarification. A complete synthesis of responses with identified themes among answers can be found in Table 4.

Table 3
Survey questions

1. Have you worked with students with Autism Spectrum Disorder (ASD) prior to this experience?
2. Why were you interested in participating in the (TOPS) program?
3. How did this exposure impact you?
4. Identify three things (positive or negative) that made an impact on you as a result of this experience.
5. Do you plan to work with individuals with disabilities as part of your profession? Please explain.
6. What surprised you most about this experience?
7. If you had the opportunity to participate again and if your schedule allowed for it, would you choose to participate?

Table 4

Synthesis of survey responses (N=15)

Questions	Responses (Synthesis)
Have you worked with students with Autism Spectrum Disorder (ASD) prior to this experience?	(12) Yes (3) No
Why were you interested in participating in the (TOPS) program?	(11) Gain experience (1) To get involved on campus (6) Enjoy working with students with ASD (3) Class requirement
How did this exposure impact you?	(5) Learned more about ASD (3) Felt more confident working with students with ASD (4) Solidified career of SPED teacher (7) Rewarding experience
Identify three things (positive or negative) that made an impact on you as a result of this experience.	(1) Learned behavior management (9) Formed relationships with students (6) Felt more comfortable/better understanding of working with students with ASD (4) Career clarification (3) Was able to self-reflect (7) Enjoyed seeing the students with ASD grow (3) The staff
Do you plan to work with individuals with disabilities as part of your profession? Please explain.	(2) Already do (1 para and other unspecified) (2) Yes- high school SPED teacher Yes- middle school level (7) Yes- not specified (3) No
What surprised you most about this experience?	(6) Connections formed, learning from students with ASD (8) How enjoyable it was (1) Difficulty for students with ASD in postsecondary options (1) Practical lessons
If you had the opportunity to participate again and if your schedule allowed for it, would you choose to participate?	(15) Yes (0) No

Discussion

Researchers agree that hands-on teaching experiences under the supervision of experienced educators, are at the heart of pre-service teacher education (Hart & Malian, 2013; Nagro & deBettencourt, 2017). In an effort to offer a quality field experience with students with ASD, we developed a partnership program held on a University campus. We set out to examine the impact of assisting in a community-university collaborative partnership on the interests and professional trajectories of graduate and undergraduate student assistants. While not all assistants were enrolled in teacher preparation programs, all assistants had an interest in education, evident by enrollment in education courses. None of the assistants had formal training in educating students with ASD. There were a few key findings from the survey results that can provide us with ideas for further research, program implementation and strengthening of the existing program. When asked how the exposure to the TOPS group impacted them, half of the assistants reported it to be a rewarding experience. In future surveys, we plan to ask further probing questions to understand more deeply why they found it rewarding. Three assistants reported feeling more confident working with students with ASD as a result of assisting in the program. Five students reported learning more about ASD and four reported that as a result of assisting in the program, they solidified their decisions to become special educators. When asked to comment on positive or negative impact as a result of assisting in the program, six assistants reported they felt more comfortable and gained a better understanding of working with students with ASD. Three assistants reported the staff made a positive impact on them. Overall, there was an overwhelmingly positive report from all assistants as a result from assisting/involvement in the program. However, there were notable limitations. First, our sample size was relatively small and data was limited. We plan to expand our investigation by collecting qualitative data by holding focus groups and asking questions that are more specified. Second, the researchers facilitated the program and distributed the survey. Although the survey was completed anonymously, this could have skewed the survey results. We are further interested in specific examples of both positive and negative experiences in order to refine the program. We plan for future survey questions to dig deeper and to be implemented throughout the program in addition to program completion. The majority of assistants found that assisting in the program was a positive learning experience. This leads us to believe that gaining field experience with accessibility on campus is one that is worth continuing in order to offer quality supervised experiences to pre-service special educators. This may lead to increased motivation in the field and greater interest in working with students with ASD, especially those who are transitioning to post-secondary activities. Three assistants reported plans other than pursuing special education. While all assistants were interested in education and invested in it by way or enrollment in the education studies minor or graduate special education program, it is interesting to note that this experience may have further grown their interest in working with students with disabilities, including ASD. Based on these results, we plan to ask in future surveys for further explanation surrounding the experiences within the program that solidified their decisions to pursue special education. Additionally, asking about teaching desired age groups (elementary, middle, high, post-secondary), disabilities (ASD, Intellectual Disabilities, Learning Disabilities, Emotional Disabilities, etc.) and inclusive environments would provide further valuable information to the researchers. One additional limitation of the data collection included post data only. As mentioned, digging further into the reasons behind the rewarding impact of assisting in the program as well as the specific instances where skills were gained and worthwhile experiences teaching students with ASD will help to

inform program development and training for assistants. Looking at how this program can teach specific skills to preservice teachers such as utilizing behavior management, teaching social skills, and collaborating with families, are areas we plan to pursue as the program continues and develops.

It is our goal to expand the TOPS assistant program for Fairfield University graduate and undergraduate students to gain firsthand experience working with students with ASD under the guidance of professional staff and experts in the field. We plan to provide graduate and undergraduate students the opportunity to participate in data collection, analytics, research presentations and writing. Including assistants in regional and national presentations to further foster their skills is a future goal of the program. Further quantifiable pre and post-test analysis looking at specific learned teaching skills as a result of assisting in the program such as behavior management and facilitating social reciprocity would also provide us with richer data from which we can further grow the training aspect of this program.

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About the Authors

Emily R. Shamash, Ed.D., is an Assistant Professor of Special Education and co-director of the Graduate Special Education Program in the Graduate School of Education and Allied Professions at Fairfield University. She is a certified special educator who specializes in working with children with autism spectrum disorders and their families. Her research interests include natural environment teaching for students with autism and related disabilities, families of children with disabilities and special education teacher education. She invites you to contact her at: Fairfield University, Graduate School of Education and Allied Professions, 1073 North Benson Rd. Fairfield, CT 06824 203 254 4000 eshamash@fairfield.edu

Alyson M. Martin, Ed.D., is an Associate Professor of Special Education in the Graduate School of Education and Allied Professions at Fairfield University. She is the co-director of the Graduate Special Education Program, as well as, the co-director of the Education Minors and 5-Year Programs. Her research interests include special education teacher burnout and stress, working with families with children with disabilities, as well as co-teaching practices in higher education. Alyson is also a certified special educator grades K-12. She invites you to contact her at: Fairfield University, Graduate School of Education and Allied Professions, 1073 North Benson Rd. Fairfield, CT 06824 203 254 4000 amartin8@fairfield.edu

The Practices of Teachers in the Development of Post-Secondary Skills in Students with Learning Disabilities

**Sara Taylor, Ph.D.
Northwest Missouri State University**

Abstract

After high school, the outcomes for youth with disabilities fail to keep up with their typically developing peers. Participation in post-secondary education, hourly earnings, and engagement in either education or employment up to six years after high school are all lower than the general population (Cameto et al., 2011). A researcher-developed online survey investigated the current strategies used with students with Specific Learning Disabilities (SLD). The questions focused on the development of skills necessary to meet post-secondary education, employment, and independent living goals. A directed content analysis did not reveal evidence that teachers are using the evidence-based practices described by the National Technical Assistance Center on Transition. The paper includes the practices of respondents. This research shows that there is a significant difference in the practices of teachers when it comes to students with SLD. These differences may contribute to decreased post-secondary engagement. There is also a lack of research and evidence-based practices for this population leading teachers to pull from unreliable sources or ignore the need for transition skills.

Keywords: post-secondary transition, specific learning disabilities, teacher practices

The Practices of Teachers in the Development of Post-Secondary Skills in Students with Learning Disabilities

According to the U.S. Department of Education (DoE) (2016), during the 2013-14 school year, approximately 8.7% of the population ages six through 21, or 5,825,505 students, were identified as having a disability, with 3.4% of the population recognized under the category of Specific Learning Disability (SLD). On December 3, 2004, Congress reauthorized the Individuals with Disabilities Education Act (IDEA 2004) (108th Congress Public Law 446, 2004). According to IDEA (2004) section (602)(30)(A), defined SLD as a "disorder in one or more of the basic phonological processes involved in understanding or in using language, spoken or written. The disorder may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations." The learning problems cannot be a result of physical or emotional disabilities nor mental retardation. Students with SLD account for 39.2% of the students served nationally under IDEA part B, which covers students aged 3 to 21, the highest percentage of any category. According to the U.S. DoE's report to Congress (2016), in 2013-14, 42.1% of students served under IDEA part B graduated with a high school diploma; of that, 71% were students with SLD. In the same period, 82% of the typically developing population, those students without a disability, completed a regular high school diploma. In California, 50.7% of students served under IDEA part B graduated with a regular diploma in four years, while 17.5% dropped out. Students with SLD account for 44.6% of the student's aged 6-21 served under IDEA part B. Compared with national statistics, California has a higher percentage of students graduating with

a high school diploma (50.7% vs. 42.1%) and a higher number of students qualified under SLD (44.6% vs. 39.2%).

After high school, the outcomes for youth with disabilities fall behind their typically developing peers. Participation in post-secondary education (55% vs. 62%), hourly earnings (\$9.40 vs. \$13.20), and engagement in either education or employment (84% vs. 95%) up to 6 years after high school are all lower than the general population (Cameto et al., 2011). Each school district mandates the diploma requirements, consisting of courses in English, Mathematics, Social Science, Science, Art, Foreign Language, and Technology. Students in special education often require remedial or support courses to complete academic coursework. When combined with district mandates, there is little room for courses explicitly targeting the skills needed for post-secondary education, employment, and independent living. While there are many high school transition programs expressly designed for students ages 18-22 with moderate to severe disabilities, and adult programs that serve this population beyond the age of 22, services end for students once they earn a high school diploma. Nationally over 42% of students with a disability are exiting high school in 4 years with a regular diploma, including over 50% of students in California, with 71% of this population being students with SLD, a step which permanently ends the support provided by special education personnel (U.S. DoE, 2016).

Post-Secondary Transition

IDEA (2004) seeks to improve educational results for students with disabilities to ensure equity of opportunity, participation, independent living, and economic self-sufficiency. Section 601(c)(14) of the law states, "As graduation rates for children with disabilities continue to climb, providing effective transition services to promote successful post-school employment or education is an important measure of accountability for children with disabilities." This document highlights the importance of providing transition services that assist students beyond a high school diploma. Section 601(d)(1)(A) asserts "the purposes of this title are to ensure that all children with disabilities have available to them a free appropriate public education...to meet their unique needs and prepare them for further education, employment, and independent living." As stated within the law, the primary purpose of the IDEA reauthorization of 2004 was to focus the efforts of special education on skills that promote post-secondary engagement for students with disabilities.

One way to promote post-secondary engagement is through transition services. Section 602(34) defines transition services "as a coordinated set of activities that...is focused on improving the academic and functional achievements of a child with a disability to facilitate the child's movement from school to post-school activities." The explanation of funding, in section 610(e)(2)(C)(vi), names transition programs and services as authorized activities. The guidelines for an individual transition plan (ITP) are presented in Section 614(d)(1)(A)(i)(VIII). Special education teachers are required before a student turns 16 to develop a plan that includes "appropriate measurable postsecondary goals based on age-appropriate transition assessments related to training, education, employment, and, where appropriate, independent living skills." IDEA (2004) defines transition services, allocates funding, and requires post-secondary assessment, and goals occur for students by the age of 16.

The Individual Education Plan (IEP) team, which includes the student, guardian, general education teacher, special education teacher, and service providers such as a speech-language pathologist, develop post-secondary goals. The goals take into account the student's interests and preferences. The IEP identifies the services and course of study needed to attain the goals and develops a plan to build the skills and supports necessary to meet the goals (Flannery, Kato, & Lombardi, 2015). IDEA 2004 requires transition services be in effect before the student is 16 years old; this results in a transition plan typically being written during the junior year of high school, leaving less than two years to build the skills necessary to meet transition goals. Correlational studies show that transition-related skills improve through interventions within the classroom (Doren & Murray, 2013). However, in a survey of special education teachers, the teachers of students with SLD reported the lowest levels of transition skills preparation and implementation (Benitez & Morningstar, 2013). Many educators do not feel sufficiently knowledgeable about transition planning to write and implement effective transition plans (Landmark, Roberts, & Zhang, 2013). Although IDEA requires special education teachers to develop activities to support post-secondary goals as a part of the IEP, and research supports instruction related to transition skills during school, survey results indicate teachers feel under prepared in the practices necessary to build these skills.

Problem Statement

Students with SLD demonstrate average to above-average intelligence quotients (IQ) with a deficit shown in academic achievement. Given their average ability to learn, the post-secondary outcomes for students with SLD should be similar to those of their typically developing peers; yet, research shows this is not the case. Students with SLD often require classes to support academic content or remediate skills leaving little room in the schedule for elective courses beyond the diploma requirements. Specialized programs do currently exist within special education to teach the skills necessary for post-secondary education, employment, and independent living; unfortunately, these programs often take place after the first four years of high school, when the majority of students with SLD have graduated.

Purpose of Study

The researcher investigated the current strategies used during the first four years of high school by special education teachers of students with SLD, specifically those designed to facilitate the development of skills necessary to meet post-secondary education, employment, and independent living goals. Surveys of special education teachers indicate teachers of students with SLD potentially lack some knowledge regarding the instruction of post-secondary transition skills (Benitez & Morningstar, 2013; Mazzotti & Plotner, 2014), yet IDEA requires the development of annually updated IEPs, which include activities to support post-secondary goals. If this population of teachers feels underprepared, in what ways are they assisting the development of post-secondary education, employment, and independent living skills? This study sought to address this gap in the literature. To fill this gap, a survey of current special education teachers gathered demographic data and information on the location, frequency, intensity, and duration of instruction and activities designed to promote post-secondary employment, education, and independent living skills. Open-ended question responses allowed for the identification of research-based practices. The benefit of this study is that the current practices of teachers are described to allow for further research.

Literature Review

IDEA 2004 mandated special education teachers use “scientifically-based” instruction to improve secondary and post-secondary outcomes for students; however, transition service providers lack the knowledge and skills to adequately implement evidence-based practices for post-secondary success (Benitez, Frey, & Morningstar, 2009). Poor post-secondary engagement in education, employment, and independent living has created a need for enhanced transition skills development that fully implements evidence-based practices (Mazzotti & Morningstar 2014; Mazzotti, Mustian, & Test, 2014). The transition perspective (Kohler & Rusch, 1996) argues that all educational programs and activities be based upon individuals' post-secondary goals and interests. This perspective supports integrating the development of post-secondary skills across grades and for all ability levels. Correlational studies suggest that transition-related skills improve through interventions within the school setting (Doren & Murray, 2013).

Teacher Surveys

Pham (2013) surveyed 248 special education teachers across 20 states using the Promoting Transition Skills Inventory (PTSI), developed by the author from the Transition Assessment Goal Generator (TAGG) (Hennessey, Kazimi, Martin, & McConnell, 2011). The PTSI measured the extent to which teachers were promoting the constructs from the TAGG. The constructs include knowledge of strengths and limitations, disability awareness, employment, goal setting and attainment, persistence, proactive involvement, self-advocacy, and utilization of supports through responses on a 7-point Likert scale from 1 (almost never true) to 7 (almost always true). Teachers rated statements about promoting transition skills as “usually true” ($M = 5.67$, $SD = 0.85$) with similar means in each construct. The author also gathered information about where special education teachers learn about transition practices. Roughly 20% of respondents learned about transition practices through either professional development or colleagues. Other sources include college courses (14%), previous experiences (14%), through trial and error (13%), conferences (11%), online sources (6%), and research journals (4%). This study found teachers self-reported promoting high levels of nonacademic transition skills while learning about transition practices from a wide variety of resources. The survey utilized research-based constructs to focus statements that the respondent rated on a Likert scale. Unfortunately, the wording appears to lead educators to the desired response, as indicated by the high mean and low standard deviation throughout the constructs. The current survey developed by the researcher utilized open-ended responses to gather more specific data about the ways in which teachers promote and develop transition skills.

Benitez and Morningstar (2013) conducted a multistate survey of secondary special education teachers. Approximately 51% of respondents were teachers of students with SLD. On a four-point Likert scale, with one being very unprepared and four being very prepared, the respondents indicated the level of preparation to perform the transition competencies as somewhat unprepared to somewhat prepared ($M = 2.69$, $SD = .65$). A one-way ANOVA showed significant differences between educators working with specific disability groups, $F(5, 543) = 5.21$, $p < .001$, with an effect size of $\eta^2 = .046$. A Tukey Honestly Significant Difference (HSD) test indicated the transition (specialists that teach students beyond grade 12) teachers' level of preparation was significantly higher ($M = 3.08$, $SD = .08$) than teachers of students with SLD ($M = 2.61$, $SD = .62$, $p < .00$), low incidence ($M = 2.53$, $SD = .64$, $p < .03$), and those that indicated a

combination of disabilities ($M = 2.66$, $SD = .66$, $p < .002$). The survey also asked the frequency of implementation of transition activities on a five-point Likert scale of 1 being never to 5 being frequently. The average overall was rarely to occasionally ($M = 2.70$, $SD = .56$). A one way ANOVA showed significant differences by student disability, $F(5, 545) = 6.04$, $p < .001$. Again a Tukey HSD highlighted differences between the transition specialist group ($M = 3.03$, $SD = .51$) and teachers of students with SLD ($M = 2.62$, $SD = .53$, $p < .01$), low-incidence ($M = 2.54$, $SD = .66$, $p < .01$), and combination ($M = 2.71$, $SD = .56$, $p < .01$). A significant correlation existed between the perceived level of preparation and the frequency with which educators reported completing transition activities ($r = .72$, $p < .01$). Staff development hours ($r^2 = .08$, $p < .001$) and the number of courses ($r^2 = .07$, $p < .001$) in transition significantly contributed to the variation in the frequency of implementation. The detailed quantitative analysis shows significant correlations between preparation and frequency of implementation, but there is no information on the ways in which teachers implement transition practices. The current survey addressed this through both categorical and open-end responses.

Mazzotti and Plotner (2014) conducted a multistate online survey of transition service providers, focusing on the implementation of evidence-based secondary transition practices. Researchers asked the frequency with which the respondent received professional development opportunities specific to evidence-based practices, with 51.8% reporting they were never or seldom provided opportunities by the school district. Over half (56.3%) strongly disagreed or disagreed that professional development prepared them to implement evidence-based practices. University preparation programs fared worse than professional development provided by school districts, with 67.4% either disagreeing or strongly disagreeing that their university teacher preparation program taught them about evidence-based practices. The survey asked how frequently (always, often, sometimes, never) the provider used evidence-based practices in seven transition-related skill areas. The majority of responses indicated they used the identified evidence-based practices always, often, or sometimes. Very few stated they never used them. This survey used evidence-based practices as the framework for data but compiled all transition service providers together. The participants included teachers of students with all types of disabilities, administrators, program coordinators, rehabilitation counselors, and other professionals. The current survey developed by the researcher specifically targeted high school teachers of students with SLD due to the high percentage of these students exiting high school after four years when compared to students with low incidence disabilities. As they exit high school, they also lose the support of special education. Moreover, previous survey results have indicated that teachers of students with SLD feel unprepared to perform transition activities.

Evidence-Based Practices

In 2009, Catherine Fowler and colleagues published a paper to identify evidence-based practices for the post-secondary transition. The researchers used the five areas of the Taxonomy for Transition Programming as study inclusion criteria and a way to organize the evidence-based practices (Kohler, 1996). Kohler defined the five areas as student-focused planning, student development, interagency collaboration, family involvement, and program structures such as program philosophy, policies, resource allocation, and human resource development. The studies analyzed came from the National Secondary Transition Technical Assistance Center (which became NTACT in 2015), the *What Works in Transition Research Synthesis Project* (Alwell & Cobb, 2009), which performed a thorough literature review through 2005, and an additional

search to identify studies published from 2005-2008. Studies needed to be either a systematic literature review or group- or single-subject experiment meeting specific quality criteria. The evidence base evaluated 240 reviews and studies. The researchers used input from Carr et al. (2005) and Compton et al. (2005) to create a series of checklists to evaluate individual studies. Overall, 63 articles met the criteria for high or acceptable quality and were used to develop the 32 evidence-based practices.

According to the National Technical Assistance Center on Transition (NTACT), an evidence-based practice is one based on group experimental, single-case, and correlational designs, which adhere to strict standards. The research must use stringent research design, display a robust record of success for improving outcomes, undergo a systematic review process, and follow quality indicators for the specific research design. All evidence-based practices were reviewed and published on the NTACT website, along with lesson plans and guides. Given the focus of this research, the evidence-based practices have been condensed to include the two which address students with learning disabilities.

Using published curricula to teach student involvement in the IEP meeting is an evidence-based practice in the areas of education, employment, and independent living developed with evidence from two high-quality group studies, three acceptable group studies, and five quality single-subject studies. Seven of the studies focused on students with SLD, with 107 total participating students. The curricula included "The Self-Directed IEP" (Jerman, Marshall, Martin, & Maxson, 1996), "Self-Advocacy Strategy," (Bos, Schumaker, & Van Reusen, 1994), "Whose Future is it Anyway?" (Garner, Lawrence, Palmer, Soukup, and Wehmeyer, 2004), and an adapted version of "Personal Futures Planning Model" (Bates & Miner, 1997). Students were provided instruction on participation in IEP meetings and transition planning, leading IEP meetings, self-determination skills, and transition awareness. The teaching took place in general education, high school, self-contained, or resource classrooms.

The Self-Determined Learning Model of Instruction (SDLMI) (Palmer & Wehmeyer, 2002) to teach goal attainment is an evidence-based practice in the areas of education, employment, and independent living based on one high-quality group study. The study included 14 students with learning disabilities. SDLMI is a curriculum focused on self-directed and self-regulated learning. The three units are: set a goal, take action, and adjust the goal or plan based on results of action. Students are taught a series of steps to solve problems: identify the problem, identify potential solutions to the problem, identify barriers to solving the problem, and identify the consequences of each solution. Lee, Little, Palmer, Soukup, and Wehmeyer (2008) conducted a study with a randomized trial control group design. The special education teachers of the students in the experimental condition received instruction in the SDLMI intervention. The average implementation time was ten weeks. Students set a goal that required action in the general education environment. Students were assessed using the Goal Attainment Scale (GAS), a 5-point rubric that compares progress across multiple targets. In the experimental condition, a higher than expected score on the GAS was shown ($M = 52.80$, $SD = 11.28$) with 65% of students at or above expected levels (raw GAS scores were converted to T scores with a mean of 50, indicating an acceptable outcome, and standard deviation of 10).

Research-Based Practices

According to the National Technical Assistance Center on Transition (NTACT), a research-based practice is one based on group experimental, single-case, and correlational research, which adheres to rigorous research designs, and has demonstrated repeated evidence of improving outcomes. Unlike evidence-based practices, research-based practices may or may not have undergone a systematic review process or adhere to all quality indicators of the specific research design.

Given the evidence for improving student outcomes, research-based practices provide valuable tools for educators. Throughout this section, effect sizes reported are obtained from Fowler et al. (2009) to allow for comparison with Pearson's r effect sizes.

Predictors of Post-Secondary Participation. According to NTACT, occupational and vocational courses are correlated, at the research-based practice level, with improved post-secondary education and employment outcomes. These courses support career awareness and exploration of career pathways, develop job skills, and assisting students in focusing on an employment goal. The course should include career awareness, planning, and assessment activities; 21st century skills, technology, and specific career content; and hands-on and community-based learning opportunities. It should also incorporate Universal Design for Learning principles, take place during the school day, and offer a wide variety of occupational clusters (Alverson et al., 2014).

Two studies found potential evidence to support the use of occupational courses. Benz, Doren, Halpern, & Yovanoff (1995) found that students who passed more than half of all courses covering topics such as remedial academics, finance, community access, and vocational education were more likely to be engaged in postsecondary education with a medium to large effect size ($r = 0.47-0.53$). Similarly, Heal and Rusch (1995) found that a student who took more hours of academic and occupational courses was more likely to obtain post-secondary employment ($r = 0.09$). The proposed survey will solicit data on the availability and student use of these courses.

The skills necessary to manage one's self-care and independent living needs include personal management skills to interact with others, daily living skills, financial management skills, and the self-management of health and wellness needs. While practice covers a wide variety of skills, assessments are needed to determine in which areas a student requires instruction. Potential topics for instruction include financial planning, self-help, cooking, housekeeping, home maintenance, using transportation, clothing care, accessing community services, time/organizational management, self-determination, social roles/citizenship, community/peer relationships, and critical thinking and problem-solving. Research promotes embedding self-care/independent living skills instruction into academic coursework in general education, special education, and the community with individual, small group, and whole-class instruction, as appropriate, with opportunities to practice skills during the school day (Alverson et al., 2014).

Self-care was found to have a small to large effect size on independent living across three studies. Heal, and Rusch (1994) saw that high scores on adaptive and self-care skills led to an increase in the likelihood of living independently ($r = 0.06$). Students with high self-care skills

are more likely to be engaged in living independently, employment, and education ($r = 0.27$) (Blackorby, Hancock, & Siegel, 1993). Similarly, students with high daily living skills, as assessed by the teachers, have an increased quality of life and higher levels of engagement in post-secondary employment ($r = 0.53$) (Brolin, Johnson, & Roessler, 1990). The current survey asked about instruction in independent living goals on the ITP, as many students with SLD are deemed, by the IEP team, not to need support in this area.

Research Questions

In California, over half of students with a disability graduate with a diploma after four years, and a high percentage of those are students with SLD. Survey results indicate that teachers self-report high levels of engagement in promoting transition skills (Pham, 2013). However, among all special education teachers, Benitez and Morningstar (2013) found that teachers of students with SLD reported the lowest levels of transition training and implementation. IDEA (2004) mandates that teachers use evidence-based practices in special education. Mazzotti and Plotner (2014) found, in a survey of transition service providers, the majority of respondents sometimes, often, or always reported utilizing evidence-based practices in seven transition-related skill areas. While NTACT reviews research on transition practices and recommends evidence-based practices, little is known about the ways in which teachers are utilizing these methods. The current survey extended the results of Pham (2013), Benitez and Morningstar (2013), and Mazzotti and Plotner (2014) by utilizing qualitative methods to discover how students with learning disabilities were assessed and received instruction in the skills necessary for post-secondary engagement with the following research questions:

1. In what ways are students with learning disabilities provided instruction and assessed for post-secondary transition goals during high school?
2. What evidence-based practices are teachers utilizing with students with learning disabilities to develop post-secondary skills?

Methodology

The research questions required qualitative methods. Qualitative research allowed the researcher to ask open-ended questions and is the ideal method for both research questions. The topic is not easy to measure and is too complicated for the presentation of a detailed understanding through quantitative measures.

Research Design

The researcher conducted a self-administered Internet survey. An Internet survey allowed the respondent control of the pace and recording of their response to ensure accuracy (Manfreda & Vehovar, 2008). It allowed for the accumulation of a large number of surveys at a lower cost than using an interviewer. An email invitation required only a single click by the respondent to move into survey completion with a reminder email sent out one week later. Upon completion of the survey, respondents had the option to complete a Google Form with their contact information to be entered into an incentive drawing. In an experimental study, Göritz, Sattler, and Van Veen (2011) found offering incentives increased response rate with no effect on perceptions of

anonymity. A meta-analysis completed by Göritz (2006) found that material incentives increased web survey completion by 27%.

The survey expanded upon research that utilized teacher surveys on transition (Benitez & Morningstar, 2013; Mazzotti & Plotner, 2014; Pham, 2013). The purpose of the study is to identify and describe teachers of students in grades nine - 12 who are developing the transition skills of diploma-bound students with Specific Learning Disability (SLD). The study sought to discover the ways in which teachers are providing instruction and assessment for post-secondary education, employment, and independent living. Open-ended questions compiled detailed accounts by participants as to the methods that they are using to develop transition skills.

Hypothesis

The study examined teachers of students with SLD due to a gap in the literature regarding current practices of teachers and survey results that indicated teachers of this population lack instruction for developing post-secondary skills of their students. The researcher suspected the open-ended results would vary across the region and districts. Based on the survey by Mazzotti and Plotner (2014), the hypothesis is that teachers will report a low frequency of use of evidence-based practices.

Population and Sample

The survey went to all high school special education teachers in three Southern California school districts. The student population of the four school districts is diverse and reflective of the Southern California population. California is an ideal research location because it has a higher graduation rate for students on an IEP and a higher percentage of students served under the category of SLD than the national average (U.S. DoE, 2016).

The survey sample consisted of all special education teachers at the high school level that report students with SLD on their caseload in these districts. School district A has nine high schools, district B has 24 high schools, and district C has 13 high schools. A request for teacher participation occurred via e-mail.

Research Sites. The research sites were all located in urban and suburban areas in Southern California. The sites provided a diverse student and teacher population. The locations vary in size, but all offered traditional high school sites to study.

School district A. This district consists of nine comprehensive high schools, two charter high schools, one continuation high school, two alternative education sites, four special education facilities, a middle college high school program, a Regional Occupational Program (ROP), and an adult education program. According to the district website, over 22,000 students attend the district schools, with approximately 53 percent of high school students identifying as white and 47 percent coming from diverse backgrounds such as Hispanic, African-American, Asian, Filipino, Pacific Islander, and Native American.

School district B. According to the district website, this district serves over 130,000 students and consists of over 226 educational facilities, serving kindergarten through 12th grade. There are 117 traditional elementary schools, 9 K-8 schools, 25 traditional middle schools, 24 high schools, 49

charter schools, and 14 atypical/alternative schools. The student population is very diverse, with more than 15 ethnic groups and more than 60 languages and dialects. The racial diversity includes 46.5% Hispanic, 23.4% White, 10.2% African American, 5.4% Filipino, 4.9% Indo-Chinese, 3.3% Asian, 0.3% Native American, 0.6% Pacific Islander, and 5.4% identifying as multiracial. Approximately 59.4% of students are eligible for free or reduced meals, and 26.5% are classified as English Language Learners.

School district C. According to the district website, this district serves over 42,000 students in grades seven through 12. There are 32 campuses with 13 traditional high schools and 11 middle schools. The student population comprises a diverse group of ethnicities, including Hispanic, Filipino, African-American, and Asian. Approximately half of the students speak a language other than English at home. Over 24,000 students receive free or reduced meals.

Data Collection

With IRB approval, an online survey was sent out to the sample teachers via email. The site "Qualtrics" hosted the survey. It allows for unlimited questions, surveys, responses, and pages with the ability to export responses. Answers are confidential and untraceable to the email address and protected with multifactor authentication. Respondents were allowed to complete the survey one time but had the option to save and continue later. An optional Google Form enabled them to submit their email address to enter the incentive drawing, but it was not tied directly to the responses.

Survey Questions. The survey consisted of a combination of multiple-choice, short answer, and paragraph responses. The questions are in Appendix A. Section 1 covered demographic information. Section 2 asked how many hours of instruction or professional development the teacher received in writing transition plans or providing transition instruction. Section 3 asked open-ended questions regarding how students were assessed for their transition plans, the ways in which the teacher-built transition skills with students with SLD, and the use of published curricula, if any. Section 4 asked a series of questions regarding whether students participated in a course specific to the development of skills in education, employment, or independent living. Next were questions targeting who taught the transition course, if indicated, as available. Another series of questions asked if students participated in pull-out activities specific to the development of skills in education, employment, or independent living, followed by questions targeting who conducted the pull-out activities, if indicated as available: the respondent, a general education colleague, or special education colleague. Altogether, the questions elicited a variety of qualitative and quantitative data to address the research questions.

Data Analysis

Theoretical and Analytical Framework. As described by David Silverman (2011), theories are like a kaleidoscope where the images change as the lens is rotated. The same is true for a theoretical perspective, which alters the focus of a researchers' data collection and analysis. The application of a valuable theory helps to organize the data, especially when elements seem disconnected from one another (Maxwell, 2008). A theoretical framework allows the researcher to focus his/her kaleidoscope on a specific area of interest that requires further explanation.

The transition perspective, as defined by Kohler (1996), provided the interpretive lens for all data. It encouraged the development of programs and activities that are focused on the students' post-secondary goals and taking into account their unique needs, interests, and preferences. Transition planning provided the cornerstone for all educational programs and activities. Kohler and Rusch (1996) assert transition planning consists of three steps: identification of post-secondary goals, the creation of instructional activities and experiences to develop the skills necessary to meet post-secondary goals, and collaboration with the student and a variety of individuals for continued progress towards post-secondary outcomes.

Analytical Methods. The responses from Section 3, the open-ended questions on the survey, and question 46 were analyzed using directed content analysis, which allowed for the identification of evidence-based practices for post-secondary education, employment, and independent living within the responses. These data answered both research questions to address how students receive instruction, are assessed, and teacher use of evidence-based practices for post-secondary skills. The directed content analysis provided for the interpretation of a text through coding, uncovering themes, and uncovering patterns with a specific focus (Hsieh & Shannon, 2005). Upon completion of the content analysis, the qualitative data was evaluated holistically to look for patterns and themes across data types.

Findings

The survey received 78 responses during the spring of 2019, which included respondents who did not meet sample criteria because they did not have students with SLD. The survey sample (n = 55) is all teachers who indicated one or more students with SLD on their caseload.

Sample Descriptive Statistics

The survey sample consisted of teachers from school district A (n = 22), district B (n = 13), and district C (n = 13). The majority of teachers reported working at a traditional high school (n = 54). Most respondents were female (n = 44) and Caucasian (n = 37). There were a variety of Education Specialist credentials held: Mild/Moderate (n = 50), Moderate/Severe (n = 12), Deaf and Hard of Hearing (n = 1), and Language and Academic Development (n = 3). The state of California issues a wide variety of added authorizations. All are represented in this sample: Autism (n = 41), Deaf-blind (n = 1), Emotional Disturbance (n = 11), Other Health Impairment (n = 5), Orthopedic Impairment (n = 1), and Traumatic Brain Injury (n = 3). The highest level of education received was commonly a Master's Degree (n = 45) with no reported doctoral degrees. The majority of teachers had several years since their last credential (M = 8.623, SD = 7.670).

The sample included teachers from programs serving students with Mild/Moderate (n = 45), Moderate (n = 4), and Moderate/Severe (n = 6) disabilities. Each participant had numerous students with SLD on their caseload (M = 15.04, SD = 10.632) with a high percentage being diploma-bound (M = 52.33, SD = 45.127).

Table 4
Means, Standard Deviations, and Range (Minimum/Maximum) for Years Teaching

Variable	<i>M</i>	<i>SD</i>	Min	Max
Total	13.29	8.583	1	39
High School	8.81	8.266	0	34
Transition	4.18	7.245	0	31
Special Education (SE)	11	7.242	1	33
SE High School	8.48	7.412	0	31
SE Transition	3.53	6.610	0	31

Question 1

Assessment. As shown in Table 5, teachers reported using a variety of teacher/ district created, online, and published assessments, and a directed content analysis was conducted to look for similarities among respondents. The most common means of assessment was a student interview ($n = 23$). The BRIGANCE ($n = 5$), which measures transition skill areas, was the most common published assessment.

Table 5

Teacher Reported Transition Assessments and their Frequency

Teacher/Online Assessments		Published Assessments	
Career Cluster Survey	8	<i>BRIGANCE</i>	5
District/Teacher Created	11	<i>Career Cruising</i>	1
Grades/Work Sample	1	<i>California Career Zone Quick Assessment</i>	1
Interest Inventory	4	<i>COPS Interest Inventory</i>	1
Interview	23	<i>My Next Move Survey</i>	1
Learning style inventory	1		
Observation	2		
Practical life skills	3		
Skill inventory	1		
Vocation specific	1		

Employment. The ITP requires a goal, activities, and services to support the development of employment skills. Table 6 shows teachers reported students are taught to build resume skills (n = 9), interview skills including mock interviews (n = 8), and how to obtain and complete job applications (n = 5). Teachers also connected students to district (n = 6) or outside agency resources (n = 4), on the job training (n = 4), paid internships (n = 2), and business/industry tours (n = 4).

Table 6

Activities to Improve Employment Outcomes and their Frequency

On-Campus Skill Building		Off-Campus Activities	
Classroom enterprise	1	Business tours	4
Executive function	1	Connect to district resources	6
Guest speakers	2	Connect to outside agencies	4
Interview	8	Career Technical Education	1
Job application	5	Job fair	1
Networking	2	Job shadow	1
Research careers	3	On the job training	4
Resume	9	Paid Internships	2
Transition class	3	Volunteer work	2

Education. In addition to ITP requirements, high school academics are designed to prepare students for post-secondary education. Teachers reported, as illustrated in Table 7, teaching students to research college options and requirements (n = 16), taking students on 2-year and 4-

year college tours (n = 8), and assisting students with college, financial aid, and scholarship applications (n = 7). Teachers also coordinated meetings with academic counselors (n = 6), Disabled Student Programs and Services (n = 5), and Department of Rehabilitation (n = 1).

Table 7

Activities to Improve Education Outcomes and their Frequency

On-Campus Activities		Off-Campus Activities	
Assist with College/FAFSA/Scholarship Applications	7	College Tour	8
Attend College Visit on Campus	1	Community College Classes	1
AVID	1	Connect with DOR	1
College Ready Goals	1	Connect with DSPS	5
Executive Function Training	1	ROP Class	1
Guest Speakers	1		
Meet with Academic Counselor	6		
Research requirements/options	16		
Transition Class	1		
Write Letters of Recommendation	1		

Independent Living. The skills needed for an adult to successfully live independently are vast. Potential topics for instruction include financial planning, self-help, cooking, housekeeping, home maintenance, using transportation, clothing care, accessing community services, time/organizational management, self-determination, social roles/citizenship, community/peer relationships, and critical thinking and problem-solving. Nearly 35% of the survey sample said the development of independent living skills with students with Specific Learning Disabilities was unnecessary. Table 8 displays teachers reported instructing students on budgeting/finance (n = 10), options for living arrangements (n = 4), and food preparation skills (n = 3). Several teachers reported off-campus community-based instruction focusing on accessing public transportation (n = 4), visiting local stores and points of interest (n = 2), and obtaining a driver's license or identification card at the Department of Motor Vehicles (n=2). Respondents also indicated connecting students to adult agencies or resources for support after high school (n = 2).

Table 8

Activities to Improve Independent Living Outcomes and their Frequency

On-Campus Activities		Off-Campus Activities	
Budgeting/Finances	10	Connect to adult agencies	2
Cleaning	1	Obtain Driver's License	1
Discuss Living Arrangements	4	Obtain ID Card	2
Food Preparation	3	Open Bank Account	1
Gardening	1	Public Transportation	4
Self-advocacy class	3	Register to Vote	1
		Visit Community Locations	2

Question 2

According to NTACT, five published curricula incorporate evidence-based practices for students with SLD. A directed content analysis revealed none of the published curricula in the survey responses. NTACT also identified vocational and occupational courses as a research-based practice for students with SLD. Only one teacher reported using occupational courses with students on her caseload. Nearly 35% of responses stated that independent living was not an area addressed in their classrooms. High levels of self-care skills have a positive correlation with post-secondary independent living (NTACT). As discussed in Question 1, a variety of on-campus and off-campus activities were reported with the intent to improve independent living skills.

Conclusions, Discussion, and Suggestions for Future Research

The 46-question survey focused on the preparation of teachers in transition skills, transition assessment of students with learning disabilities, instruction in post-secondary skills, and demographics. The survey results created a detailed picture of the current practices in three large southern California school districts.

Summary of Findings

The qualitative analysis reveals that teachers utilize a wide variety of assessments and on/off-campus activities to develop post-secondary education, employment, and independent living skills. There are no consistencies between or across districts with a low frequency reported in most areas. The teachers were involved in teaching students with SLD the skills necessary for post-secondary education, employment, and independent living, but there is no indication of the use of evidence-based practices.

Conclusions

Transition Assessment and Practices. There appears to be little consensus among practitioners in the sample on assessments or practices related to transition. Student and family interviews were the most commonly reported assessment. The challenge with developing an evidence-base for the use of an interview is the inherent lack of structure and inconsistencies in implementation. Teachers most frequently reported assisting with resumes and job interview skills. While these help a student obtain a job, it does little to help them maintain engagement in post-secondary

employment. Respondents focused their efforts in the area of post-secondary education on 2-year colleges and 4-year universities. The most regularly reported activity was the research of the requirements for colleges of interest to the student. Focusing on college does not show students all the options or teach them strategies to help maintain enrollment.

The expanse of independent living skills is the most overlooked transition skill area for students with SLD. Almost 35% of the sample reported: “Most of my students do not need assistance with independent living” or a similar sentiment. The lack of development of independent living skills is not unexpected but alarming, nonetheless, considering the complexity of independent living. The most common topics of instruction were budgeting or public transportation, but there were low frequencies throughout the responses. Overall, there was a wide range of activities described with low frequencies, including food preparation, self-advocacy, and support to obtain a driver’s license or identification card.

Evidence-Based Practices. NTACT identified a small number of evidence-based practices for students with SLD, supporting their absence from responses. Only one response indicated using occupational courses with students. Even when the research base was expanded to include research-based practices, they did not appear in the responses. One participant stated, “In your survey, I learned that there is a curriculum I can utilize when working with my students. I would love to use that in the future because the training on post-secondary transition planning in my schooling and the district training always seem abstract/vague.” The survey questions did not include the phrases evidence-based or research-based, but by asking about the published curriculum used, this teacher was enlightened to their existence.

Discussion

The qualitative results provide practices for further evaluation to develop an evidence-base. Published assessments such as the BRIGANCE and COPS Interest Inventory need additional research with students with SLD to develop an evidence-base. In order to use an interview as an assessment, a standard protocol must be developed and tested. Practices such as on the job training, internships, and volunteer work show promise but also lack operational definitions or evidence-bases to demonstrate their effect on post-secondary engagement in employment. Executive function activities were reported. These activities may support engagement in education as it is studied in a variety of age groups with a research-based curriculum available, yet additional research is needed to show whether such an emphasis is helpful for students with SLD. Self-advocacy is well researched with several published curricula to teach student involvement in the IEP meeting as an evidence-based practice supporting all areas of post-secondary engagement. The survey responses did not include these curricula, so it is unclear how or whether respondents developed self-advocacy skills.

Engagement in post-secondary education, employment, and independent living are the keys to a successful life. The limited research, evidence-based practices, and research-based practices that involve students with SLD, the most common educational disability, are concerning. This lack of research creates challenges for teachers as they seek to develop post-secondary education, employment, and independent living skills of their students.

Limitations

The survey was conducted exclusively in southern California with credentials and added authorizations specific to the state. The small sample size led to difficulties in conducting quantitative analysis. Several quantitative questions relied on self-report, which can lead to errors. The survey consisted of 46 questions, which took an average of 17.5 minutes to complete and may have discouraged participation.

Suggestions for Future Research

Survey. The researcher developed a survey and conducted it in southern California. The survey contained questions that did not yield the expected information. The survey will be revised to reflect credentials in another state and distributed to gather additional data. The goal of this future study will be to gather practices to study and adapt to create additional evidence-based practices.

Evidence-Based Practices. Of the 32 evidence-based practices to develop transition skills described by NTACT, only two were developed to support students with SLD: using a published curriculum to teach IEP participation and the SDLMI (Palmer & Wehmeyer, 2002) to teach goal attainment. Given the prevalence of students with SLD in special education and their underperformance in post-secondary engagement, additional research is needed to identify and describe evidence-based practices for this population. Specifically, practices are needed that positively influence engagement in post-secondary education, employment, and independent living for students with SLD.

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About the Author

Sara Taylor, Ph.D., is an Assistant Professor in special education at Northwest Missouri State University. Before joining the faculty at NWMSU, she worked as a special education teacher for over 9 years and earned her Ph.D. at the University of California, Riverside. Her research targets teacher preparation, post-secondary transition outcomes, and teacher practices for students with learning disabilities, and special education eligibility.

Using Social Stories to Decrease Negative Behaviors in Students with Autism and Other Disabilities

**Vivian C. Williams, Ed.D.
University of California Santa Barbara**

Abstract

Social stories are effective interventions that can be used to manage negative behaviors and develop social skills. However, contradictory results are suggested within the research because of variability in designing social stories, intervention phases, target behaviors, and treatment protocol. Social story interventions may reduce negative behaviors among many children and adolescents with autism, other pervasive developmental disorders, and emotional and behavioral disabilities. Many research studies focused on the implementation of social stories with children and adolescents who range from 3-15 years of age. From these studies, social stories were found to be an effective intervention for increasing appropriate behaviors and decreasing challenging behaviors. This paper examines current research in the use of social stories' intervention to reduce negative behaviors for students with autism and other disabilities.

Keywords: validity, tracking, peer reviewed intervention (PMI), social narrative, pervasive developmental disorder (PDD), autism, asperger, emotional disturbance (ED)

Using Social Stories to Decrease Negative Behaviors in Students with Autism and Other Disabilities

Several studies have been conducted that examined the impact of implementing social stories to reduce challenging behaviors in children with autism and other disabilities where positive outcomes were found. Other studies reported an increase in appropriate behaviors with the use of social stories (Delano & Stone, 2008). Social stories are effective interventions that have been used to manage negative behaviors and develop social skills. Results of research has remained contradictory for the use of social stories to decrease negative behaviors in students with autism and other disabilities, due to variability in the design of social stories, intervention phrases, identified target behaviors, and treatment protocol. This paper examined research that utilized quasi-experimental and single-subject design methods to study the use of social story interventions to reduce negative behaviors for students with autism and other disabilities.

Wong (2013) reported that social stories were listed under the evidence-based practice of social narratives. In social narratives, social situations are comprehensive and include relevant cues and examples for appropriate responding. In addition, the learner's individualized needs dictated the short, story descriptions, and often the stories encompassed pictures or other visual aids. According to Gray (2010), social stories included a written description around an identified target behavior and the social situation outlined the specific behaviors that were expected to occur. Additionally, Gray reported that challenging behaviors could be managed in numerous settings with story-based interventions. Story based interventions provided a simple way to teach individuals with autism spectrum disorder (ASD). Gray and Gerand (1993) introduced the most recognized story-based intervention (social story). Like Gray (2010), Gray and Garand

defined social stories as written from the child's perspective and including short, simple texts and visual supports. The authors introduced social story interventions to children with autism as a strategy to teach them how to read social situations. Although social stories were developed specifically to help students with autism, the authors also acknowledged that children with autism were not the only children who struggled with proper responding and understanding in social situations. Consequently, students with a variety of disabilities may benefit from social story interventions.

Keeter and Bucholz (2012) indicated that many students with varying disabilities struggled with emotional functioning in social situations. Children with learning disabilities, as well as attention deficit hyperactive disorders, intellectual disabilities, and emotional behavior disorders also benefited from social story interventions. Specifically, Delano & Stone (2008) found that students identified with emotional or behavioral disorders that exhibited inappropriate social behaviors had difficulty engaging in appropriate play and often presented aggressive behaviors. Keeter and Bucholz (2012) expanded research on social stories and added the use of literacy-based (social story) interventions with students with intellectual disabilities. Positive results in behavior were found using social stories and focusing on a target behavior for a group of middle school students with mild/moderate intellectual disabilities. Additionally, Delano and Stone (2008) extended the use of social stories to young children with emotional and behavioral disabilities (EBD). Sansosti and Powell-Smith (2006) recommended the use of social stories for a child with Asperger Syndrome (AS). Volmar and Klin (2000) described children with Asperger Syndrome as children with average to above average cognitive skills, who also lacked an understanding of appropriate social behaviors and had limited social interaction abilities.

Harjusola-Webb, Hubbell and Bedesem (2012) reported that social story interventions were easy to design and implement in a classroom setting. They described social stories as a strategy that involved the child reading a simple, unique story with detailed explanations on how to negotiate a situation that was challenging to the individual child. Some social narratives may be offered as a printed book that presents a challenging social situation. Others social narratives are described as more complex and included digital stories with PowerPoint and video. Additionally, the authors implemented a combination of peer-mediated intervention (PMI) and social narratives as a combined model. Peers were trained to facilitate prosocial interactions with a 5-year old boy with autism by helping to teach the target behavior of turn taking in an inclusive classroom. The benefits from the combined intervention of PMI and social stories resulted in increased turn-taking interactions and appropriate social skills. Considering both PMI and social narratives as evidence-based interventions for increasing positive behaviors were incorporated, the study concluded it was difficult to differentiate the direct benefit of the social story alone. Conclusively, the authors determined that the combined model of PMI and social stories increased positive behaviors for both, children with disabilities and their peers.

Similarly, Spencer, Simpson and Lynch (2008), stated that social stories were not designed to address all behavior situations; therefore, they should not be implemented separately but within a child's overall educational plan. Previous research studies combined social stories with other interventions such as, verbal prompting (Cozier & Tincani, 2005), schedules, prompting and token economies (Kuttler, Myler, & Carlson, 1998) and videotaped feedback to teach social skills (Theimann & Goldstein, 2001). The use of social stories simultaneously with other

interventions allowed children with ASD and other disabilities to engage in learning appropriate behaviors with positive outcomes.

Delano and Stone (2008) identified some advantages for using social stories in the classroom. The advantages included teachers can individualize social stories to the specific needs of each child, the instructional time needed is minimal, and other effective strategies can be easily incorporated. Social stories supported students with emotional and behavioral disabilities, through behavior intervention plans and social skills curriculum. Several studies supported positive effects of using social stories including Adams, Gouvousis, VanLue and Waldron (2004), who found a reduction in challenging behaviors and Barry and Burlew (2004), who reported an increase in appropriate behaviors.

Graetz, Mastropieri and Scruggs (2009) implemented an intervention with three adolescents with ASD. They utilized a modified social story and addressed specific behaviors. The modified social stories included real photographs, many visuals and were written to address individual target behaviors. The target behaviors of the three adolescents included refusal, using a loud pitch voice and placing one's hands and objects in mouth. The authors did not follow the original social stories guidelines purposed by Gray & Garand (1993). Social stories, with the use of visuals (color photos) were an effective intervention and resulted in a decrease in inappropriate behaviors for adolescents with ASD. A multiple baseline design was used to track the data that concluded with immediate reductions in inappropriate behaviors (Graetz, Mastropieri & Scruggs, 2009).

Sansosti and Powell-Smith (2006) also utilized a multiple baseline across participants design. Three elementary students with Asperger Syndrome participated in social story interventions that addressed their targeted behavior during the school day. Their intervention included a parent component with journaling and tracking levels of appropriate social interactions with typical peers. After the implementation of social stories, two of the participants showed increased social engagement; therefore, a measurement of effectiveness was noted in the summary. However, no evidence of maintenance or generalization of skills was documented for the participants.

Keeter and Bucholz (2012) used social stories with five middle school students who had an educational diagnosis of intellectual disability. The students were placed into two groups based on the targeted behaviors of "calling out" and "off task". Three students exhibited off-task behaviors and two students exhibited calling-out behaviors. Although the social stories were not individually written for each participant as proposed by Gray and Garand (1993), all participants decreased their targeted behaviors after the social story interventions.

Social story interventions may reduce negative behaviors among many children and adolescents with autism, other pervasive developmental disorders, and emotional and behavioral disabilities. Many research studies focused on the implementation of social stories with children and adolescents who range from 3-15 years of age. From these studies, social stories were found to be an effective intervention for increasing appropriate behaviors and decreasing challenging behaviors. However, most social story interventions do not represent an independent means of changing behavior in children with autism. Several studies identified social stories as just one intervention strategy, out of many that were needed to improve social and behavior skills. In

fact, incorporating social stories into a child's overall educational plan or daily schedule was suggested.

Rhodes (2014) confirmed that social story interventions were successful with the majority of the participants in a study using single subject designs. This study included 15 children between the ages of 3 and 15 years in an educational setting. Despite the variation in the level of success by each participant, Rhodes identified four common themes. The themes that emerged were the participants' ability to read their own social stories, the use of verbal prompts, treatment integrity and teacher acceptance, and maintenance. Thirteen of the 15 participants demonstrated a reduction in the frequency of their individual disruptive behaviors after social story interventions. Rhodes concluded that social stories were beneficial in helping to decrease negative behaviors and did not cause harm or stigma to students. Additionally, social stories were accepted by both teachers and parents. Gray and Garand (1993) clarified that the use of simple language to explain events that take place in social situations can set the stage for targeting appropriate behaviors.

In a quasi-experimental design between subjects by Hanrahan, etc. (2020) digital social stories interventions were implemented with a group of 9-children on the autism spectrum. A randomized control trial was implemented, as well as an attentional control group for 6-children. The study concluded that the use of digital technology to reduce variability in social story interventions, demonstrated significant improvements in maladaptive behaviors for students with autism. Despite, the limitation of small sample sizes, the increase methodological rigor and intervention fidelity provided consistent evidence of digital social stories and their positive impact on behavior.

Considering the importance of social validity and competence that resulted from social story interventions, it was noted as essential for students with ASD and other disabilities to engage in evidence-based practices. Therefore, continued research on the benefits of social stories in decreasing challenging behaviors is one of the next steps in studying this evidence-based intervention. In addition, due to the ease in designing social stories, the ability to individualize stories and, the opportunities to foster generalization of skills in the natural environment for some children; more research is needed (Harjusola-Webb, Hubbell & Bedesem, 2012).

The future direction for the implementation of social stories should include the identification of what are the specific target behaviors that are more likely to garner benefits,. Additionally, continue to utilize methods and procedures that employ experimental control and greater validity, as well as measuring the impact of enhanced visuals added to stories. Further, consider the benefits of combining other evidence-based interventions with the social story (Sansosti & Powell-Smith, 2006). Finally, more research is recommended to measure the impact of social stories with older students and young adults with autism and other disabilities. We must continue to identify the critical components of social stories that are responsible for the greatest impact to the improved behavior of children and adolescents with disabilities, and determine how to best implement and integrate social stories in natural environments (Graetz, Mastropieri & Scruggs, 2009).

Limitations noted throughout the research concluded that some social stories differed from the original guidelines by Gray and Gerand (1993), making it difficult to access components responsible for improved behavior. A lack of consistency in social story designs was also mentioned (Graetz, Mastropieri & Scruggs, 2009). Further, limitations included the length and phrase of social story implementation, the fidelity of implementation by teachers, paraprofessionals and parents, as well as the training protocol (Sansosti & Poell-Smith, 2006). Evidence of positive outcomes from social story interventions in decreasing challenging behaviors has not been generalized for all students with autism and other disabilities. Consequently, additional research should continue to investigate the effectiveness of social story interventions for children with autism and other disabilities.

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About the Author

Vivian C. Williams, Ed.D., is Deputy Superintendent of Academics, Students and Schools for the Jackson-Madison County School System in Tennessee. She earned her undergraduate degree in secondary education from Lane College, Master's degree from the University of Memphis, and doctoral degree from Union University. Additionally, Dr. Williams completed graduate certificates in Autism Spectrum Disorders and Applied Behavior Analysis. Her areas of expertise are autism and related disabilities, behavior interventions, and academic interventions for struggling readers. Dr. Williams has collaborated on several research projects at both the state and university levels. At the state level, Dr. Williams was selected to serve as one of nine writers for the "Tennessee Reading First Guide to Effective Reading Instruction – *Lesson Adaptations for Struggling Readers*." Dr. Williams has also been a general and special education teacher, elementary and middle school principal, Director of Special Education, Chief Academic Officer, Chief Student Support Officer, and has taught special education, curriculum, and school leadership courses at several colleges and universities.

***Using Technology-Based Interventions to Improve the Social-Communication Skills of
Adolescents with Autism Spectrum Disorder (ASD)***

**Dr. Nicole Anthony
Dr. Cynthia Wooten**

Fayetteville State University

Abstract

For more than two decades, researchers have used technology-based interventions to treat symptoms associated with autism spectrum disorder (ASD). Drawing on a preference for technology-driven devices, many advances have been made in the research and treatment of ASD; however, the overwhelming majority of the technology-based interventions are used to address the social-communication challenges of children with ASD under the age of 10 years-old. Thus, the literature review aims to: (a) identify and examine studies that have used technology-based interventions over the past 30 years to improve the social-communication abilities of adolescents with ASD; (b) summarize findings of relevant variables (e.g., participant demographics, experimental setting, and technology-based strategies used to deliver the intervention); and (c) based on reported empirical outcomes, it will be determined, if technology-based interventions are effective in improving the social-communication skills of adolescents with ASD. Results of the current review indicated that technology-based are effective when used to address the social-communication skills of adolescents with ASD. Implications for future research are discussed.

Keywords: Autism, ASD, adolescents, social-communication, technology

***Using Technology-Based Interventions to Improve the Social-Communication Skills of
Adolescents with Autism Spectrum Disorder (ASD)***

Autism Spectrum Disorder (ASD) impacts how a person behaves, communicates, and socializes (American Psychiatric Association [APA], 2013). The complexities of an ASD diagnosis are unique to each individual, and for the most part, based on the severity of the symptoms and existing co-conditions (Klinger, Dawson, Barnes, & Crisler, 2014). For instance, some children with ASD are nonverbal, and others converse using sophisticated language (Fodstad, Matson, Hess, & Neal, 2009). When faced with joint bids for attention, some children with ASD may engage in self-stimulating behaviors such as hand flapping, rocking back and forth, or spinning while others engage in escape behaviors (Rudy, Betz, Malone, Henry, & Chong, 2014). Although these idiosyncratic behaviors fluctuate from one individual with ASD, social-communication impairment is a defining feature of the disorder (Kennedy & Adolphs, 2012; Reed, Hyman, & Hirst, 2011).

As early as preschool, children with ASD demonstrate social-communication challenges that distinguish them from their typical peers. In comparison to same age preschoolers, children with ASD vocalize less, engage in solitary play more often, and gravitate toward adults instead of playmates (Fodstad et al., 2009). Once children with ASD enter elementary school, they have an arduous time interacting with their peers due to the inability to capture the subtle nuances of the

conversations around them (Rao, Beidel, & Murray, 2008). As the demands for social interaction increase in middle and high school, even for adolescents with ASD who develop strong functional language skills, challenges persist in conversing with others (Kim et al., 2013). For example, common challenges in social-communication skills include issues with initiating interactions, difficulties with maintaining eye contact, managing turn-taking and topics of discussion, responding to peers in an appropriate manner, and not fully understanding the perspective of others (Daniel & Billingsley, 2010; Kennedy & Adolphs, 2012; Qi et al., 2018). For example, Daniel and Billingsley (2010) found that in a sample of 10-14-year olds with ASD, all participants attributed their lack of peer interactions to not wanting to initiate contact. Ultimately, lack of social interactions can exacerbate the possibility of being socially isolated, rejected by peers, and bullied (Kagohara et al., 2013a). If not remediated, impairments in social-communication skills can negatively impact future outcomes for adults with ASD.

In a critical review of empirical studies that examined social outcomes for adults with ASD, Levy and Perry (2011) reported that even in adulthood, parents of individuals with ASD initiated and orchestrated social interactions for their children due to the lack of initiative on their part. This lack of initiative by adults with ASD may affect familial bonds, independent living, and community relationships (Levy & Perry, 2011). While 86% of typical peers live independently in adulthood, only 4% of adults with ASD develop the social-communication skills necessary to accomplish this task (Levy & Perry, 2011). Additionally, after analyzing NLTD-2, Shattuck et al. (2012) found that 50% of young people with ASD who left high school did not participate in employment or postsecondary education more than two years after graduation. Furthermore, young people with an ASD had the lowest rates of participation in employment and the highest rates of no participation compared with youth in other disability categories (Shattuck et al., 2012). These findings suggest there is a need for effective interventions to address the social-communication challenges experienced by adolescents with ASD; however, researchers have focused less on this age group, with research studies predominately including preschool- and elementary-age children as participants (Odom et al., 2015; Wong et al., 2014). The enigmatic nature of ASD produces challenges for professionals in the field to elucidate effective, unobtrusive, socially acceptable strategies that can address social-communication skills. Fortunately, because of the nature of current trends in socialization and communication among adolescents with ASD, technology-based interventions could possibly fill this void.

Technology and Adolescents with ASD

For more than two decades, technology has taken a more prominent role in research and treatments related to ASD (Mazurek, 2013). With the introduction of computer laptops, iPods, iPads, and iPod Nanos, and virtual reality systems, technology-based interventions are more accessible and socially acceptable than cumbersome traditional intervention methods like book bound social stories or picture exchange communication systems (Kim et al., 2013; Mazurek, 2013). Technology-based interventions have emerged as tools that can potentially lead to more effective evidence-based practices and an improved quality of life for individuals with ASD (Bolte et al, 2010; Ploog, Scharf, Nelson, & Brooks, 2013). Many researchers have suggested potential reasons why technology-based interventions may be particularly effective (Kuo et al., 2014; Mazurek, Shattuck, Wagner, & Cooper, 2012; Odom et al., 2015; Shane & Albert, 2008). For example, Mazurek et al., (2012) found that among a sample of 920 children and adolescents

with ASD, 64.2% of the individuals surveyed spent most of their time engaging in screen-based activities (e.g., T.V, videos, and electronic or video games). Moreover, when compared to other disability categories (speech/language impairment, learning disabilities, intellectual disabilities), the rate of nonsocial-media use was higher among the ASD group (Mazurek et al., 2012). In a similar study, Kuo et al. (2014) surveyed 91 adolescents with ASD found that 78% of the adolescents with ASD watched television approximately two hours a day, and 98% used computers approximately five hours on any given day. Shane and Albert (2008) suggested visual presentation of information is a more desirable form of learning and support for many adolescents with ASD.

Purpose of the Study

Due to adolescents' with ASD preference for technology-based devices and given the need for the development of appropriate social- communication skills, the purpose of this literature review is two-fold. First, the review of the literature will identify and examine studies that have used technology-based strategies from 1990-2020 to improve the social-communication skills of adolescents with ASD. Second, the authors will summarize findings of relevant variables (e.g., participant demographics, experimental setting, and technology-based strategies used to deliver the intervention). Specifically, the review of the literature will answer the question, "Are technology-based interventions effective when used to improve the social-communication skills of adolescents with ASD?"

Method

Search procedures

Studies included in this review of the literature were located by conducting a search of peer reviewed journal articles published between 1990 to 2020 utilizing ERIC, EBSCO Host, and PsycInfo databases. Search terms included *autism, autism spectrum disorder, ASD, adolescents, emotional recognition, social skills, social initiations, social responses, social-communication, communication, computer, and technology* were used singly and in various combinations to produce articles for the review. Then, using the reference lists of each study located through ERIC, EBSCO Host, and PsycInfo databases, a hand search was conducted to find additional studies in the journals of *Focus on Autism, Journal of Autism and Developmental Disabilities, and Autism*. Additionally, previous reviews of the literature that examined the efficacy of technology-based interventions for individuals with ASD were reviewed for identification of additional studies (Grynszpan et al., 2014; Odom et al., 2015; Ploog et al., 2013; Ramdoss et al., 2011; Wainer & Ingersoll, 2011). Odom et al. (2015) review of the literature only targeted technology-based interventions for adolescents with ASD and included several studies found in Wong et al. (2014) comprehensive review of technology-based interventions for children and youth with ASD. In addition, the Wong et al. (2014) review covered literature from 1990 to 2011 while Odom et al. (2015) conducted an additional computer and hand search of the literature for studies published between 2011 and the end of 2013. Odom et al. (2015) identified a total of 30 articles that met the inclusion criteria as technology interventions for adolescents and young adults with ASD; however, only five studies addressed the communication or socialization skills of the identified group.

After the electronic and hand searches were completed, the abstract for each identified article was examined. The search produced 42 articles which were screened against the inclusionary and exclusionary criteria.

Inclusionary and Exclusionary Criteria

There were six inclusionary criteria utilized to determine whether an article was included in this literature review. First, participants must have been identified as having ASD. Second, the study must have contained independent variables that targeted social-communication skills such as verbally initiating or responding during a conversation or emotion recognition (selected skills determine the quality of social interactions for individuals with ASD). Third, studies must have assessed the effectiveness of a technology-based intervention for only adolescents with ASD. The World Health Organization (2016) defines adolescents as those people between 10 and 19 years of age. Fourth, the study must have employed a rigorous experimental design (e.g., multiple baseline, alternating treatment, or a group design). Fifth, all studies must have been published in peer reviewed journals between 1990 and 2020. Sixth, only studies conducted in the United States were included. Excluded from the review were: (a) studies that did not include adolescents with ASD; (b) studies that did not use a technology-based strategy to deliver an intervention; (c) studies that consisted of findings that were reported in an anecdotal form; (d) studies that solely addressed the enhancement of life skills. After applying the inclusionary and exclusionary criteria, this search generated seven studies. Table 1 below provides a description of reviewed studies.

Table 1. *Reviewed studies*

Authors	Year	N	Age	Tech-based intervention	Targeted skills	Setting	Outcomes
Hurwitz, Ryan, and Kennedy	2019	4	12-17	Dual-first person Video recording glasses	Nonverbal Communication and conversational reciprocity	University-based Clinic	All participants modified behaviors
Kagohara et al. (b)	2013	2	10-11	Computer presented social stories and iPad delivered video models	Simple and Complex greetings	Elementary School	Both participants increased targeted skills
Macpherson, Charlop, and Miltenberger	2015	5	10-11	Video Models	Compliments to peers	Behavior treatment Center	Increased verbal compliments peers for all participants
Ozonoff and Miller	1995	9	13-17	Videotaped performance feedback	Theory of Mind activities	School and Clinic	Increased performance on Theory of Mind task
Plavnick and Duenas	2018	4	15-17	Video Models	Questions and Comments	High school classroom	All students increased social interaction skills
Plavnick, Kaid, and McFarland	2015	4	14-17	Video-based group instruction	Joining activities, request, and comments	Self-contained classroom	3 out of 4 participants increased skills fourth participant mixed results
Wendt, Hsu, Simon, Dienhart, and Cain	2019	3	14-19	iPad-based Speech Generating Device	Requesting and speech production	University-based clinic	All three participants significant improved requesting behaviors during intervention phase

Results

Description of Studies

Seven articles address the social-communication skills of adolescents with ASD. Table 1 contains summarized information from the identified research studies. The following information can be found in Table 1: (a) participant characteristics; (b) social-communication skill targeted; (c) setting; (d) type of technology-based intervention; and (e) reported intervention outcomes.

Participant characteristics

A total of 33 adolescents with ASD participated in the identified research studies. The age range for participants was 10-19 years old. Participants attended elementary, middle, and high school and their primary diagnosis was ASD.

Targeted Social-Communication Skills

All seven articles addressed multiple social-communication skills. Researchers targeted interactional skills like asking questions (Plavnick & Duenas, 2018), making comments during play activities (Macpherson et al., 2015), requesting information (Plavnick et al., 2015; Wendt et al., 2019), and simple and complex verbal greetings made towards teachers and research staff (Kagohara et al., 2013). Nonverbal communication skills and conversational reciprocity (Hurwitz et al., 2020) were also addressed using a technology-based strategy. One research study utilized Theory of Mind activities (Ozonoff, & Miller, 1995).

Setting

Some research studies (Hurwitz et al., 2020; Macpherson et al., 2015; Wendt et al., 2019) took place in clinical settings, while three studies (Kagohara et al., 2013; Plavnick & Duenas, 2018; Plavnick et al., 2015) occurred in school. One study occurred in a school and a clinical setting (Ozonoff, & Miller, 1995).

Technology-based Instructional Strategies

Several of the studies (Kagohara et al., 2013; Macpherson et al., 2015; Plavnick & Duenas, 2018) used video models as a form of intervention. Video modeling is an evidence-based practice defined as the presentation of a model demonstrating a targeted skill using videotape, DVD, or computer presentation (Kagohara et al., 2013; Sansosti & Powell-Smith, 2008). In the past, video modeling has been used to promote the acquisition of new skills such as imitation, joint attention, mathematical concepts, academic responding, and initiating contact with peers (Kagohara et al., 2013). Video modeling has evolved from using videotapes and televisions to a readily accessible intervention for individuals with ASD (Sansosti & Powell-Smith, 2008). Studies under current review also used video-based group instruction (Plavnick et al., 2015), iPad-based speech generating device (Wendt et al., 2019), dual-first person video recording glasses (Hurwitz et al., 2020), and videotaped performance feedback (Ozonoff, & Miller, 1995).

Reported Intervention Outcomes

Results from Hurwitz et al., (2020) study indicated that all four adolescents modified their nonverbal communicative behaviors during subsequent conversations. Kagohara et al., (2013) found that both students increased the number of verbal greetings made towards teachers and research staff above baseline levels. After the introduction of the video model intervention, Macpherson et al., (2015) results indicated that study participants increased verbal compliments

to peers. Ozonoff, and Miller (1995) study participants increased performance on Theory of Mind task. Plavnick et al., (2015) results revealed that three out of four participants demonstrated improvement of targeted skills, with mixed outcomes for the fourth participant. Plavnick and Duenas (2018) results indicated all participants increased social interaction skills. Finally, Wendt et al., (2019) found that all three participants significantly improved requesting behaviors during the intervention phase.

Discussion

The purpose of this review of the literature was to identify studies that used technology-based interventions to increase the social-communication skills of adolescents with ASD. In addition, the question was asked, “Are technology-based interventions effective when used to improve the social-communication skills of adolescents with ASD?” Based on the reported results of each study included in the current review of the literature, technology-based strategies are effective when used to improve the social-communication skills of adolescents with ASD. Results of the current review are unsurprising as previous reviews of the literature found that interventions using technology as a delivery model were promising practices. For instance, Ramdoss et al. (2011) evaluated 14 studies that used computer assisted technology (CAT) to teach social-communication skills to individuals with ASD. Researchers indicated that while CAT appeared to be a burgeoning practice, it cannot be considered an efficacious intervention tool. In a similar review, Ploog et al. (2013) reviewed 45 studies that used CAT to improve the social, communicative, and language development of children, adolescents, and adults with ASD. Ploog et al. (2013) divided the research studies into four main categories: language, emotion recognition, theory of mind, and social skills. Like Ramdoss et al. (2011), Ploog et al. (2013) found that strategies utilizing CAT were very promising; however, most studies lack rigorous, scientific assessment of efficacy in relation to more traditional intervention methods. In a more recent review of a technology-based intervention, Qi et al., (2018) synthesized 24 research studies that used single case research designs (SCRD) to examine the effects of video model on the social-communication skills of individuals with ASD. Qi et al., (2018) applied the What Works Clearinghouse (WWC) SCRD design standards to the studies identified during the review. Findings from the synthesis concluded that video model intervention is an evidence-based practice according to the WWC standards for increasing social-communication skills of individuals with ASD.

Studies from the current review illustrated how technology-based strategies can be effective when implemented at school and a clinical setting. With the number of computer applications and programs available for computers, iPads, iPod, iPhones, and now virtual reality, practitioners in the field have a myriad of intervention delivery options available in multiple settings. However, the task of empirically validating each intervention must be done. The current review indicates that technology-based interventions are effective when used to improve the social-communication skills of adolescents with ASD. Future research using technology-based interventions should be conducted to add to the social-communication literature for adolescents with ASD.

Conclusion

Adolescents with ASD display social-communication challenges that may include the inability to initiate or respond to peers in an appropriate manner. Adolescents with ASD may also be unable to decipher the perspectives of others. Social-communication challenges have the potential to

impact friendships, familial bonds, and post-secondary opportunities. Practitioners in the field realize the importance of remediating these skills, so for more than twenty years they have employed technology-based strategies as intervention tools. Drawing on a preference for technology-driven devices, many advances have been made in the research and treatment of ASD. Technology-based strategies are effective; however, research studies still need to be empirically validated and many of these studies focus on remediating the social-communication challenges of children under the age of 10 years-old. Understanding the life-long impact of social-communication challenges faced by individuals with ASD, researchers must now turn their focus to addressing the needs adolescents with the disorder.

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About the Authors

Dr. Nicole A. Anthony serves as the assistant chair of the Early Childhood, Elementary, Middle Grades, Reading, and Special Education department in the College of Education. Her research interests include adolescents with autism spectrum disorder (ASD) social-communication development, transition outcomes for African American students with ASD, and postsecondary opportunities for children with disabilities. With more than 20 years of experience as an educator, she has remained committed to creating equitable and inclusive spaces for students with disabilities. Dr. Anthony spearheaded the Autism Advisory Council at FSU, which is dedicated to meeting the needs of children with ASD in Cumberland County. The council is

composed of faculty, students, parents, and autism-related community organizations. The Autism Advisory Council is believed to be the first of its kind on the campus of an HBCU.

Dr. Cynthia Brooks Wooten is an Assistant Professor of Elementary Education, in the College of Education at Fayetteville State University. She received her Ph.D. from the University of North Carolina Greensboro. Her dissertation titled, Multiple Case Studies of Literacy Practices Utilized by Intermediate Grade Teachers Which Enable African American Males to Become Literate Individuals-What's Going On?, focused on accomplished teachers of African American males. Research interests relate to preservice teacher preparation, experiential learning, literacy education, literacy instruction for Black males, multicultural education, and beginning teacher support. Dissemination of research is accomplished via presentations at state, national, and international level conferences.

Association of Intellectual Risk Taking with Science Achievement of Gifted Students and Comparison of their Intellectual Risk Taking in Different Grades and Gender

Dr. Mustafa Serdar Köksal
Hacettepe University

Dr. Esra Açıkgül Fırat
Adıyaman University

Dr. Gamze AKKAYA
Inonu University

Abstract

This study explores the association between intellectual risk taking and science achievement of gifted students and difference in grade levels and gender. The participants were 122 sixth, seventh and eighth grade gifted students in Turkey. In data collection, “science achievement test” and “intellectual risk taking scale in learning science” were utilized. For analyzing data, non-parametric tests (Spearman correlation, Mann-Whitney U and Kruskal Wallis) were used. The findings revealed that while there were no significant difference in gender, and the relationship between risk taking and science achievement was not statistically significant, the study determined significance in the difference between grade levels. A significant decrease in eighth grade was observed. This study warns about clear decline in eighth grade in terms of intellectual risk taking and about active participation to learning.

Keywords: Intellectual risk taking, science achievement, grade level, gender, gifted education.

Association of Intellectual Risk Taking with Science Achievement of Gifted Students and Comparison of their Intellectual Risk Taking in Different Grades and Gender

Learning science in classrooms is a process involving uncertainties and risks (Byrnes, 1998). In this situation the learner is at risk of making mistakes or looking as less able than other learners. This type of risk taking is called as “intellectual risk taking (IRT)” (Beghetto, 2009). Beghetto (2009) defined IRT “*as engaging in adaptive learning behaviors (sharing tentative ideas, asking questions, attempting to do and learn new things) that place the learner at risk of making mistakes or appearing less competent than others*”. Beghetto (2009) and Beghetto and Baxter (2012) suggested an empirical association between IRT and learning science. Actually the term “risk” calls negative thoughts however IRT is an adaptive form of risk taking (Dweck, 1999). Adaptiveness of IRT is associated with its link of student learning and achievement. Since Streitmatter (1997) reported that IRT is positively correlated with academic achievement of students. Moreover Cakır and Yaman (2015) found that science achievement of elementary and middle school students is positively correlated with their intellectual risk taking levels. Due to its adaptive and learning-centered feature, IRT has a high potential to contribute to participation of learning activities and acting to learn individually. When challenging science subjects are represented in classrooms, taking intellectual risks are needed more than before. Challenging subjects involves uncertainties and new components, and requires different ways of thinking.

Actually gifted students prefer these type of subjects in spite of the fact that their non-gifted counterparts do not prefer so (Rogers, 2007). Hence taking intellectual risks in learning science is needed for gifted students when they learn challenging scientific subjects. Tay, Ozkan and Tay (2009) revealed that gifted students at fourth, fifth, sixth and seventh grades represented high-level intellectual risk taking. But there was no empirical evidence of the association of IRT with learning science of gifted students. It was also shown that IRT decreases through grade level of students (Beghetto, 2009; Dascı & Yaman, 2014). However this finding was not tested with gifted students. Based on the two rationale; need for investigating association between IRT and learning science of gifted students, and need for investigating the associations in terms of grades of gifted students led this research. The purpose of this study is to investigate association between intellectual risk taking and science achievement of gifted students while also considering grade level.

Science achievement, intellectual risk taking of gifted students in different grades and genders

Gifted students has different characteristics than their peers in terms of different invaluable variables. For example, they have stronger learning motivation (Agaliotis & Kalyva, 2019) and higher achievement than their peers (Köksal, 2013). Science achievement of gifted students are higher than their counterparts because they perform better in academic tasks than their nongifted peers and have higher ability on mental tasks (Arfa, Lovell, Podell, Goldberg, 1998; Köksal, 2013; Seidenberg, Giordani, Berent & Boll, 1983). But it is known that increasing science achievement of gifted students to higher levels is possible by adding challenge to teaching processes (Rogers, 2007). Rogers (2007) mentioned three aspects of challenge in gifted classrooms: providing consistent challenge (increase in difficulty of subjects), working independently and taking depth and complexity into account. Teaching with both challenge and enrichment requires providing these three aspects in teaching science. Dealing with challenge increases motivation (Lupkowski-Shoplik & Assouline, 1994), facilitates autonomy (Betts & Neihart, 1986), and has the potential to decrease boredom in regular science courses (Kanevsky & Keighly, 2003).

However increase in science achievement by dealing with challenging tasks requires being an active participant in learning process. Intellectual risk taking is a factor of active participation into learning process (Beghetto, 2009). Despite the results such as getting negative reactions, taking intellectual risks such as asking questions and sharing thoughts, contribute to learning by providing active participation (Byrnes, 1998; de Souza Felith, 2000). Therefore by intellectual risk taking gifted students might increase their high level science achievement to higher levels than their previous achievement.

In classrooms of gifted students, supporting intellectual risk taking is necessary for development of higher-order thinking and learning about challenging subjects (de Souza Fleith, 2000). Dismissive science teaching classrooms increase existent level of boredom of gifted students because discouragement of students' idea expression and prior knowledge (von Aufschnaiter, Erduran, Osborne & Simon, 2008) and discourse in one direction (Chin, 2007) occur in this type of classrooms. On the other hand classrooms supporting intellectual risk taking involves opposite components supporting gifted students' learning without boredom. The actual process or characteristic of curiosity in gifted students involves intellectual risk taking (Sandhu & Kaur,

2015). Creatively gifted students may exhibit sensible risk taking behavior as an observable characteristic of giftedness, as noted on identification scales (Renzulli, 2005). Hence they are naturally drawn towards involvement in learning environments supporting intellectual risk taking. van Tassel-Baska (2001) also emphasized importance of intellectual risk taking in talent development process of gifted students and suggested providing opportunity of expression and valuing of differences in gifted education classrooms.

However it is seen in the literature that taking intellectual risks for learning science decreases from through grade level of students (Beghetto, 2009; Dascı & Yaman, 2014). Dascı and Yaman (2014) studied with 100 at 4-8th grade students by using Beghetto (2009)'s scale, the results of the study showed that intellectual risk taking level of 4th and 5th grade students were higher than the students at 6th, 7th, and 8th grades. Beghetto (2009) investigated reports of 585 elementary level students about intellectual risk taking in learning science his findings also revealed that intellectual risk taking level of the students were negatively correlated with grade level. Clifford (1991), and Clifford and Chou (1991) also reported decline in intellectual risk taking with age but they claimed that pressure on error-free learning and perfectionism in education, increased social comparison and competitive evaluation policies caused the decline in intellectual risk taking. On the other hand there is another study showing a different finding (Cakır and Yaman, 2015). Cakır and Yaman (2015) collected data from 208 5-8th grade students about intellectual risk taking and their study showed that there were no significant difference in intellectual risk taking levels of the students across their grade level. However numbers of the students in each grade were very different from each other and appropriate post-hoc test was not used in this study. So its results may have limited transferability.

When looking at the gender factor, conflicting results were observed; some studies reported significant differences while the others found no significant difference in terms of gender. Akkaya (2016) compared female and male gifted students in fourth grade and found no difference between them in terms of intellectual risk taking. However, Fesser, Martignon, Engel and Kountze (2010) reported that females avoid more forms of intellectual risks than males. Akdağ, Köksal and Ertekin (2017) studied 53 gifted students; their findings showed that there was no significant difference in intellectual risk taking scores in terms of gender.

The findings of the studies showing the decline by grade are based on the data of ordinary students and results on differences of intellectual risk taking in gender is conflicting. Actually, gifted students' intellectual risk taking for learning science might represent a different picture in terms of changes with grade level, since the different from their typical counterparts in terms of "asking challenging questions", "discussing difficult subjects" and "being critical of others" which are examples of intellectual risk taking behavior (Chan, 2001; Park & Oliver, 2009). The main expectation is that gifted students increase their activities regarding intellectual risk taking due to the increase in challenge of subjects across the grade level. Hence it is hypothesized that intellectual risk taking levels of gifted students increase through the grade level and also there is need to look at difference in intellectual risk taking with a new sample to contribute to evaluate the conflicting results in the literature.

Method

Correlational research and causal-comparative design were used in this study. Correlational research was used to investigate the relationship between intellectual risk taking and science achievement, and causal-comparative design is used to determine whether there is a significant difference in students' intellectual risk taking in terms of gender and grade level (Fraenkel, Wallen & Hyun, 2012).

Participants

The participants were 122 sixth, seventh and eighth grade gifted students in three different provinces in Turkey. The distribution of students in terms of gender and grade levels is in Table 1.

Table 1.

Distribution of students' gender and grade levels

Gender	Female		Male			
	N	%	N	%		
	72	59	50	41		
Grade level	6. grade		7. grade		8. grade	
	N	%	N	%	N	%
	76	62,3	31	25,4	15	12,3

Data Collection Tools

In order to collect data, Science Achievement Test and Intellectual Risk Taking Scale in Learning Science were used in the study. Intellectual Risk Taking Scale in Learning Science, was developed by Beghetto (2009) and adapted to Turkish by Yaman and Köksal (2014) and validity / reliability studies were conducted. The scale has four factors (Intellectual risk taking (IRT), creative self-efficacy (CS), interest in science (IS) and teacher support (TS)) and consist of 18 items. The Science Achievement Test (SAT) used in the research was developed by Aşut (2013). The reliability coefficient of the test is 0.92 which consists of 45 questions. The test includes questions from all three disciplines of Chemistry, Physics and Biology.

Data analysis

In order to analyze the data, the outliers are discarded by first converting the data to z values. Then, the Shapiro-wilk test was performed, skewness and kurtosis values were calculated, and histogram graphs were examined to determine the suitability of the data to normal distribution. As a result of the analyses, it was determined that the data did not conform to the normal distribution in any of the variables and it was decided to apply non-parametric tests. Spearman correlation coefficient was calculated to determine the relationship between Science Achievement and Intellectual Risk Taking. Mann-Whitney-u test was used to examine students' intellectual risk taking in terms of gender, and Kruskal-Wallis test was used to examine in terms of grade level. In addition, effect size values were calculated to test the significance in practice. Furthermore, Mann-Whitney U test was performed to make pairwise comparisons of variables with significant differences according to Kruskal-Wallis test results. When interpreting the results, a significance level of 0.05 was used as the criterion. However, Bonferroni correction

was applied as $p = 0.003$ ($p = 0.05 / 15$), in order to reduce the error rate, since a total of 15 tests were performed on the whole scale and its sub-dimensions.

Findings

The Spearman correlation coefficient calculated for determining the relationship between science achievement and intellectual risk taking is shown in Table 2.

Table 2.

The correlation coefficients between science achievement and intellectual risk taking

		IRT	IS	CS	TS	Achievement
IRT	r	1,000	,228*	,559**	,323**	-,084
IS	r	,228*	1,000	,307**	,472**	,067
CS	r	,559**	,307**	1,000	,541**	,159
TS	r	,323**	,472**	,541**	1,000	,158
Total	r	,814**	,576**	,779**	,680**	,103

When Table 2 was examined, it was found that there was no significant relationship between intellectual risk taking, its sub-dimensions, and science achievement. The results of the Mann-Whitney U test to determine whether the students' intellectual risk taking scores differ significantly in terms of gender are shown in Table 3.

Table 3.

Results of the Mann–Whitney U test analysis

		N	Mean rank	Sum of ranks	U	Z	p
IRT	Male	59	47,95	2829,00	1059	-1,425	,154
	Female	43	56,37	2424,00			
IS	Male	59	49,64	2929,00	1159	-,798	,425
	Female	43	54,05	2324,00			
CS	Male	59	54,05	3189,00	1118	-1,028	,304
	Female	43	48,00	2064,00			
TS	Male	59	51,19	3020,00	1250	-,127	,899
	Female	43	51,93	2233,00			
SUM	Male	72	57,76	4159,00	1531	-1,401	,161
	Female	50	66,88	3344,00			

When Table 3 was examined, it was found that there was no statistically significant difference in the average scores of students of intellectual risk taking scale and sub-dimensions in terms of

gender. The results of Kruskal-Wallis test analysis to determine whether there is a statistically significant difference in terms of grade level are given in Table 4.

Table 4.

Results of the Kruskal-Wallis test analysis

	Grade level	N	Mean rank	Chi-square	df	p	Effect size	Mann-Whitney U
IRT	6. grade	66	54,53	14,409	2	,001	0,99	6.grade-8.grade, 7. grade-8. grade
	7. grade	25	57,44					
	8. grade	11	19,82					
IS	6. grade	66	52,05	,079	2	,961		
	7. grade	25	50,28					
	8. grade	11	51,00					
CS	6. grade	66	52,14	,398	2	,820		
	7. grade	25	52,12					
	8. grade	11	46,23					
TS	6. grade	66	51,47	,456	2	,796		
	7. grade	25	49,38					
	8. grade	11	56,50					
TOTAL	6. grade	76	65,31	4,841	2	,089		
	7. grade	31	60,94					
	8. grade	15	43,37					

As a result of the analyzes, it was determined that there was a statistically significant difference in general intellectual risk taking scores in terms of grade level, while there was no statistically significant difference in sub-dimensions. The calculated effect size value (0,99) shows that the difference between the grade level of the gifted students' intellectual risk taking has a high practical importance. In addition, according to the Mann-Whitney U test results, it was determined that there were significant differences between 6th grade and 8th grade, and 7th grade and 8th grade.

Discussion

The findings of this study showed that intellectual risk taking of gifted students has no significant association with science achievement. Moreover, there was also no significant difference in intellectual risk taking of female and male gifted students. However there was a significant difference between the students in different grades. When we looked at the findings in detail, no association between intellectual risk taking and science achievement is not an expected finding. Because, previous studies reported a statistically significant association between them. For example, Beghetto (2009) and Çakır and Yaman (2015) found an association between achievement and intellectual risk taking. Discrepancy between our current finding and the literature might be related to difference in samples (gifted students) and measurement tools for science achievement. Both of the studies have involved typical students and used achievement tests developed for typical students. But such kind of instruments might cause a ceiling effect

when you use it for gifted students (McBee,2010). It is not a true way of using such kind of achievement tests in research on gifted students. As a limiting factor, sample size is also another important factor to explain current finding of this study, so more number of subjects could also be used in future studies to decide about difference between literature and the current findings of this study. For the second finding (no gender difference in intellectual risk taking of female and male gifted students), we did also expect no difference between genders as shown in the literature, since study of Akdağ, Köksal and Ertekin (2017) focused on gifted sample and they also found no difference between males and females. Akkaya (2016) also reached the similar finding. Hence it can be said that gifted female and male populations did not vary across gender in terms of intellectual risk taking. As a possible reason of this finding, it can be said that previous identification process might narrow the difference between males and females since it selects similar students in terms of their intellectual characteristics. But we did not know about affective characteristics of gifted students such as intellectual risk taking, identification might lead to selection of similar students in terms of the intellectual risk taking. Moreover teachers might nominate frequent risk takers without considering their gender and following testing might have provided narrower population. This reason should be tested with larger sample sizes using the routine identification process in Turkey.

As represented in findings section, there was a significant difference between sixth graders' scores and eight graders' scores in favor of sixth graders. Moreover significant difference between seventh graders' scores and eight graders was observed in favor of seventh graders. This finding is an expected one since previous studies since Dascı and Yaman (2014) showed that intellectual risk taking level of 4th and 5th grade students were higher than the students at 6th, 7th, and 8th grades. Beghetto (2009) also reported that intellectual risk taking level of the students were negatively correlated with grade level. As possible reasons for this decline with age, pressure on error-free learning, increased perfectionism, increased competition and social comparison play a role in this situation. As a support, Clifford (1991), and Clifford and Chou (1991) reported decline in intellectual risk taking with age but they claimed that pressure on error-free learning and perfectionism in education, increased social comparison and competitive evaluation policies caused the decline in intellectual risk taking. However, we need to develop a model with other affecting factors involving learning environment, learning processes, peer relationships, teacher-student interaction and adolescence. Hence there is a need to make more comprehensive statistical analysis to see clearer picture about this decline.

In conclusion, this study represents important findings about intellectual risk taking behavior and science achievement of gifted students and change in their behaviors across gender and grade level. However, using non-parametric statistical analysis and relatively small sample size is limiting factors, also the instruments used in the study have limitations with their reliability and validity. Using comprehensive statistical analysis with larger samples is suggested and additional data resources should be used to collect data in detail.

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About the Authors

Mustafa Serdar Köksal is a proffessor at the Special Education Department in Hacettepe University. His primary focus is on nature of science, intellectual risk taking, web based education, gifted students and science education. He visited science education department of Florida State University for collaboration about a project regarding inquiry-based teaching. His field study is “science education for gifted students”. He is an editorial board member of ”Journal of American Academy of Special Education Professionals” and “Education and Science Journal”. Also he was chair of the congress; International Congress of Gifted and Talented Education (IGATE-2018; 2019).

Esra Açıkgül Fırat is an assistant professor at the Department of Science Education, Department of Science and Mathematics Education in Adıyaman University. Her research interests are in the area of science education, STEM education, Web 2.0 tools for education, biotechnology education, intellectual risk taking and computer assisted science education.

Gamze Akkaya worked as a assistant professor at Special Education Department in İnönü University in 2017-2019 after working as a science teacher at Ministry of National Education. Between 2015-2017, she worked as a science teacher of gifted students in Science and Art Center. Her research interests are “Science Education on Gifted and Talented Students” and “Teaching by modeling” and “Intellectual risk taking”. She has organized and managed IGATE’18 and IGATE’19.

Correspondence author: Esra Açıkgül Fırat, Department of Science and Mathematics Education, Faculty of Education, Adıyaman University, Adıyaman.
Phone: +904162233800-1069

Fax: +904162231426

Email: eacikgul@adiyaman.edu.tr, eacikgul@gmail.com

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Applying Empathy Curriculum to Enhance the Role of the Paraprofessional for Students with Multiple Disabilities

**Christopher Russel
Soribel Genao, PhD**

CUNY, Queens College

Abstract

The primary aim of this paper is to address how empathy curriculum can be applied to training needs of paraprofessionals working with students who have multiple disabilities. A thorough review of the literature on the role of the paraprofessional and implications for training and supervision is provided. This is juxtaposed with a review of the literature on empathy training/curriculum, and a discussion on the potential for applying empathy curriculum to existing needs for paraprofessional training. Results of a survey of 32 paraprofessionals working with students with multiple disabilities across New York State are presented. The survey emphasizes paraprofessionals' experience with training relevant to components of empathy, and self-reported perceptions of effectiveness in developing positive relationships and supporting holistic educational programs for students with multiple disabilities. The review and synthesis of literature from these two fields, and the survey results, suggest that empathy curriculum is a relevant area of training need to paraprofessionals, and further research is warranted on the topic.

Keywords: Paraprofessional, training, empathy curriculum

Applying Empathy Curriculum to Enhance the Role of the Paraprofessional for Students with Multiple Disabilities

The role of the paraprofessional in providing educational supports to students with multiple disabilities has been increasingly prevalent in the past decades, despite a general lack of cohesive research guiding the effective preparation and implementation of this role. The most recent available data from the National Center for Education Statistics (2013) indicates that over 464,000 full-time (FTE) paraprofessionals provided special education services nationwide, an increase of almost 150,000 since 2004, and a larger total number compared to the number of full-time special education teachers (Douglas et al., 2019; NCES, 2013). It was estimated that 70% of these paraprofessionals worked with students who have severe disabilities (Biggs et al., 2016). Chopra et al. (2011) reported an average increase of 49% in the employment of paraprofessionals in the 2000s. The increase in the prevalence of this role since its inception under The Individuals with Disabilities Education Act (IDEA, 1997; Rev. 2004) has been widely credited to the inclusion movement of the 1990s, and the subsequent impact of No Child Left Behind policies on the proliferation of inclusive educational placements for students with disabilities (Chopra et al., 2011).

IDEA defines a paraprofessional as “a school employee who works under the direction of a certified staff member to support and assist in providing instructional programs and services to children with disabilities or eligible young children” (Walker et al., 2017; IDEA, 1997). The

reauthorization of IDEA in 2004 clarified that “paraprofessionals and assistants who are appropriately trained and supervised” can be “used to assist in the provision of special education and related services” (Section 612 [a][14][B][iii]; Brock & Carter, 2015). Literature focusing on the roles that paraprofessionals play on the educational team emphasizes a widespread lack of clarity and a variability in specific implementation of the role across the field.

The various responsibilities of paraprofessionals may include “(1) providing instruction in academic subjects; (2) supporting students with challenging behaviors; (3) providing personal care; (4) facilitating peer interaction; and (5) collecting and managing data about the students” (Tews & Lupart, 2008, p. 39). Chopra et al. (2011) described the broad scope of paraprofessional roles as, “instructor, connector, behavior support facilitator, team member, personal care provider, and culture broker” (p. 16).

Giangreco (2010) has asserted the problem of increased reliance on paraprofessionals to perform roles for which they are generally ill-prepared, stating, “There is no strong conceptual or theoretical basis for assigning the least qualified, lowest paid, often inadequately supervised staff, namely paraprofessionals, to provide the bulk of instruction for students with the most complex learning characteristics” (p.3). While training (pre-service and in-service) is often cited as the single most significant need to enhance the effectiveness of the role, as elaborated below, Giangreco further warns that the solution of training may be masking the larger conceptual problem that exists with the very designation of the role of paraprofessional (Giangreco, 2012). Studies conducted in the past decade emphasize that the prior literature on paraprofessionals is centered around “what constitutes inappropriate and appropriate service delivery” (Biggs et al., 2016), and these more recent studies tend to focus instead on training needs and recommendations for more effective collaboration and supervision. In addition, Paraprofessionals themselves are often “discounted and underappreciated” (Lankes, 2011), which may be a reason to the lack of performance and increase desire for training to take place.

Training Needs

While IDEA (Rev. 2004) calls for “appropriate” training of paraprofessionals, there is a strong consensus across research on paraprofessionals regarding a general lack of appropriate training, including both pre-service preparation for the role and in-service professional development (Biggs et al., 2016; Brock & Carter, 2015; Giangreco, 2012; Tews & Lupart, 2008) State requirements for paraprofessional certification and professional development to maintain licensure vary widely. In New York, “Level I Teacher Assistants” are required to hold a high school diploma, GED or HSE, to pass a state certification examination, obtain fingerprinting clearance, and to complete workshops on Child Abuse Identification, School Violence Intervention and Prevention, and the Dignity for All Students Act (NYSED, 2019). In New York City, paraprofessionals must have a NYS Teacher Assistant certificate, and have completed 25 days’ work as a substitute paraprofessional (NYCDOE, 2019). No pre-service disability-specific training is required in either case.

Research suggests that without the appropriate training and supervision, paraprofessionals have potentially “inadvertent detrimental effects” on student outcomes (Giangreco, 2010). These negative impacts may be interpersonal in nature (hindering the development of social relationships with peers), intrapersonal (causing overdependence and learned helplessness), or

interfering with access to curriculum and teacher instruction (Brock & Carter, 2015; Giangreco, 2010; Tews & Lupart, 2008). Work identity is a way in which to synthesize different identities together, including personal and social identities, in order to discover those facets of a paraprofessional that influence their perceptions of work and the “corresponding ways in which they behave when performing their work” (Bothma, Lloyd, & Khapova, 2015).

While few studies have looked specifically at student perspectives on their experiences with paraprofessionals, generally this data has revealed positive student perceptions of the relationships. However, some of these positive impressions could mask the possibility of a negative overall impact on the student, as in a common “mothering” or “protecting” relationship causing increased dependence and threatening self-determination (McGrath et al., 2010; Tews & Lupart, 2008).

Paraprofessionals are generally reported to express an interest in receiving additional in-service training (Brock & Carter, 2015). However, a recent review of 26 studies on paraprofessional training materials established a clear need for further development of quality training materials that are aligned with federal legislation guidelines and paraprofessional competencies (Douglas et al., 2019). In-service training topics relevant to paraprofessionals include behavioral strategies, communication techniques, understanding the impact of specific disabilities, and implementing specific interventions. While one study surveying 286 paraprofessionals found that 86% had received some form of in-service training, the perceived value and relevance of that training was questionable (Walker et al., 2017). Although the literature is vague regarding what specific training paraprofessionals would benefit from, and rather asserts the need for training that matches the role, setting, and students (Giangreco, 2011), several studies emphasize the value of supplementing training with intensive coaching and mentoring (Brock et al., 2017; Brock & Carter, 2015; Martin & Alborz, 2014; Stockall, 2014). Walker et al. (2017) asserts the critical importance of not limiting in-service training to one-time events, as this tends to result in only brief, rather than sustained implementation. Brock and Carter (2015) further reiterate, “...research across disciplines has shown that single-event training has little or no impact on everyday practice” (p. 40). Students with IEPs that require direct one on one support throughout parts of a school day often requires a special understanding and empathy when working with families. Paraprofessionals must be supported by teachers and administrators in how communication channels and systems of communication are set up with families (DPI, 2019). The implication is that targeted training must be followed by coaching and/or mentoring in order to be maximally effective. Moreover, research suggests that mentoring is most welcomed by paraprofessionals when provided by on-site teachers or team members, rather than by outside experts (Walker et al., 2017).

A literature review conducted in 2013 (Brock and Carter) suggested that with “adequate training,” paraprofessionals can improve in their ability to implement specific educational intervention programs. Additional research focusing on the effectiveness of targeted in-service training for paraprofessionals, especially in the areas of implementing behavior and communication programs, has reinforced this conclusion. (Walker et al., 2017; Brock & Carter, 2015). While research suggests that there are effective models of training paraprofessionals to engage in behaviors that support positive student outcomes, this does not imply that there is a correlation between behavioral skill development and attitudinal shift between paraprofessional

and student. While teachers are trained and prepared to teach, work of teaching is not only done by those who are paid as teachers, but also by a large number of paraprofessionals (Quinn and Ferree, 2017).

Supervision of Paraprofessionals

Despite the clear mandate under IDEA that paraprofessionals must be supervised by certified professionals, “the laws provide vague and limited descriptions of what paraeducator supervision entails” (Chopra et al., 2011, p. 16). Research generally indicates that teachers may not be equipped to provide adequate support and supervision to paraprofessionals. The Council for Exceptional Children outlines several competencies for teachers in the supervision of paraprofessionals (Council for Exceptional Children, 2009). “Despite the CEC (2012) guidelines that pre-service teachers have the skills ‘to structure, direct, and support the activities of paraeducators,’ very little attention has been given to preparing teachers specifically in this area” (Biggs et al., 2016, p. 270). Additional research is needed to shed light on the extent to which teacher preparation programs across the country are including targeted content in this area across curricula.

Teacher leadership has been described as the most important factor in the successful implementation of paraprofessional services. Effective teacher leadership involves collaboration and mutual respect, and an environment in which the paraprofessionals’ contributions to the team are valued (Chopra et al., 2011). Rapport and clear delineation of roles between teachers and the paraprofessionals with whom they work has also been identified as important to guide the effective provision of special education services (Stockall, 2014). Perceptions of respect and appreciation for paraprofessionals by other team members, including teachers and administrators, and the extent to which they feel their voice is heard on the team, impacts the effectiveness of paraprofessionals in performing their role on the team. (Biggs et al., 2016) In their study defining the major influences that affect teacher-paraprofessional relationships, Biggs et al. (2016) identified “teacher mind-set” as an important factor, which included “being understanding and responsive” to paraprofessionals and demonstrating “patience, empathy, and thoughtfulness.”

In contrast, studies seeking information on the perspectives of paraprofessionals regarding negative influences on job satisfaction have consistently identified lack of respect, low salaries, job uncertainty, lack of training, and responsibilities that are not commensurate with their training or pay (Carter & Sisco, 2011; Hughes & Valle-Riestra, 2008; Abbate-Vaughn, 2007; Giangreco et al., 2001). Importantly, the literature supports an impression that paraprofessionals’ job satisfaction and self-efficacy is increased dramatically when they feel “understood” and respected by teachers and staff who are “very knowledgeable about their work” (Giangreco et al., 2001, p. 489).

Adequate teacher supervision of paraprofessionals is often discussed in terms of “don’ts” rather than “do’s.” Common “don’ts” include designating inappropriate levels of work or inappropriate instructional duties beyond the purview of the paraprofessional’s training (Ruppar et al., 2016). Lack of supervision altogether has also been seen as a common issue, though research indicates that paraprofessionals supporting students with moderate to severe disabilities receive more supervision than those working with students who have mild (e.g. learning) disabilities (Irvin et

al., 2017). There is a lack of research investigating what specifically constitutes adequate or appropriate supervision.

In addition to the immediate supervisory role of the teacher, administrators play a crucial role in supporting successful outcomes with paraprofessionals (Brock et al., 2017; Biggs et al., 2016). There is a dearth of research investigating the extent to which administrators provide adequate supervision for or establish collaborative relationships with paraprofessionals. While the role of administrators includes arranging or facilitating in-service training and mentorship for paraprofessionals, there is no apparent research exploring trends in or guidelines for enhancing these practices on an administrative level.

Impact of multiple disabilities and implications for paraprofessionals

Multiple disabilities (one of the 13 IDEA disability classifications) is defined as “concomitant impairments (such as intellectual disability-blindness or intellectual disability-orthopedic impairment), the combination of which causes such severe educational needs that they cannot be accommodated in special education programs solely for one of the impairments. Multiple disabilities does not include deaf-blindness” (IDEA, 2004, Sec. 300.8(c)(7)). Students with multiple disabilities (also described as students with severe/multiple disabilities) are an extremely diverse population across demographics, and the vagueness of this categorization presents a challenge in describing the specific needs of this population. Students with multiple disabilities are generally described as having “the most complex learning characteristics” (Giangreco, 2010, p. 3), and constitute the group with the highest risk for visual impairments, hearing loss, cognitive/intellectual challenges, physical/orthopedic disabilities, and complex health care needs (Silberman, 2000). While deafblindness, the most low-incidence disability, is allotted a separate IDEA classification, the latest census (Deaf-Blind Child Count) shows that 38% of students with deafblindness in the US (3,539 students) have an IDEA classification of “Multiple Disabilities” (NCDB, 2018).

Empathy Training and Curriculum

Empathy is defined with some variation depending on the context. Lam and colleagues (2011) have defined empathy as “an individual’s capacity to understand the behavior of others, to experience their feelings, and to express that understanding to them” (p. 163). This definition involves three distinctive components of empathy, respectively: *cognitive*, *affective*, and *behavioral*. Empathy has been informally linked to positive outcomes in the provision of human services including in educational, social services, and medical fields. Actual data linking empathic levels in professionals with specific outcomes is limited and lacks congruence and scientific validation (Lam et al., 2011; Institute for Innovation, 2016).

Many different scales for measuring empathy have been developed, for a variety of implementation purposes. These standards mainly rely on self-reported data on cognitive and affective empathy. Behavioral empathy is often evaluated in the context of implementing interventions, such as in positive behavior interventions for students, or specific medical protocol geared toward patient comfort and satisfaction. In their systematic review of 29 studies on empathy training, in addition to highlighting limitations in the research, Lam and colleagues (2011) intimated that it is possible to train a person to *behave* empathically (behavioral empathy)

whether or not they actually *feel* empathy for another person (affective empathy). The question of whether someone can be trained to *feel* empathy has been debated extensively across fields.

Empathy curriculum, or the structured and deliberate training of empathic responses, must include some degree of experiential training to gain exposure and increase understanding of the lives of others, whether through role-play, simulation, or facilitated visits to the communities of others. Additional methods of training may include targeted skill development, video playback, mindfulness training, and writing training (“asking trainees to write from the other’s point of view” [Lam et al., 2011, p. 175]). Boske and colleagues (2017) conducted a study exploring the application of empathy curriculum to promote social justice leadership in schools, training pre-service administrators through a variety of cognitive and experiential methodologies. In this study, the authors emphasized the critical need for school leaders to be able to take the perspective of people in the communities they serve, increasing both self-awareness and awareness of others in order to encourage a humanistic approach to leadership with the goal of increased solidarity. The study assumed the existence of an inherent problem that school leaders often come from incongruent experiences in relation to the students (and often the staff) with whom they work (Boske et al., 2017).

The application of empathy curriculum in education has mainly focused on pre-service training of administrators and teachers to increase cognitive and behavioral empathy with their students and staff (Boske et al., 2017; Drigas & Papoutsis, 2015; Barr, 2013; Bevel & Altrogee, 2010; Kitchen, 2005). As Bevel and Altrogee (2010) assert, “Among the most important qualities an education candidate (whether she be a teacher or administrator) can develop are the abilities to have a deep understanding and sensitivity to the feelings and needs of others” (p. 52). In their paper on the topic, Bevel and Altrogee described an internship course for Ed. S. students in which the candidates were required to shadow a student with a disability for 15-20 hours, and to spend 30 hours either with the family of a child with a disability, or working with an advocacy group for students with disabilities. This experience, supplemented by use of a reflective journal (what Lam and colleagues [2011] called “writing training”), was found informally to have increased both cognitive and affective empathy for students with disabilities and their families in pre-service administrators.

Barr (2013) conducted a study on the extent of 181 student-teachers’ empathic attitudes toward students with disabilities, using a research-based empathy scale, The Interpersonal Reactivity Index (Davis, 1980). Results indicated that while quantity of contact and exposure to students with disabilities is itself a mild predictor of increased empathy (or at least of increased positivity in attitudes), there is likely “an interpersonal quality that, perhaps, may play a more vital role...” (p. 95). Again, the research indicates that while cognitive and behavioral empathy may be trainable, affective empathy may be intrinsic. Interestingly, this study also suggested that education majors, whether in general or special education, have comparably higher levels of empathy toward individuals with disabilities than the general population (Barr, 2013).

As compared with the education field, research dealing with medical and other clinical paraprofessionals is not as lacking in evaluation of the role of empathy. In fact, the Institute for Innovation (2016) has compiled a table summarizing the results of fifteen research studies between 2012-2015 investigating various approaches toward understanding, measuring, or

teaching empathic responses toward patients. Amongst these studies, Bearman et al. (2015) looked at using a simulation approach to develop empathic responses towards patients in a pre-service health care professional program. The approach, which consisted of facilitated role play and asking participants to “act in the role of patient,” appeared to be successful in developing empathy. There are clear parallels between simulation/role play and the “field excursions” to visit the communities of the “other” described by Boske et al. (2017); both are attempts, in pre-service training, to induce “perspective taking” responses, asking the participant to step into the world of the subject (patient/student).

Applying Empathy Curriculum to Paraprofessional Training

While many studies have focused on paraprofessional training needs, a review of the literature including Douglas and colleagues’ recent analysis of 26 studies on paraprofessional training materials (2019) revealed no examples of inquiries looking specifically at the levels of empathy in paraprofessionals, and no research indicating that approaches in empathy training have been applied to paraprofessionals. The CEC paraprofessional competencies (Rev. 2015) include items ostensibly targeting cognitive and behavioral empathy, for example: “Characteristics of one’s own culture and use of language, and how these may differ from individuals with exceptionalities from other cultures (PCCG.1.K10),” or “Use strategies as determined by the instructional team in a variety of settings to assist in the development of social skills (PCCG.2.S16).” The lack of pre-service training for paraprofessionals is certainly a barrier to implementation of existing models of empathy curricula from which administrators and teachers – and thus their students – may have benefitted.

The field of education for students with deafblindness has addressed the matter of empathy and emotional congruence, or “affective involvement,” extensively in writings over the past 40 years. Moreover, national efforts from the field have concentrated recently on developing the unique role of *intervener*, defined as “an individual who works consistently one-to-one with a student who is deafblind” and “Who has training and specialized skills related to deafblindness” (Alsop et al., 2004). The intervener is essentially a 1:1 paraprofessional who is trained in unique content and skills related to supporting a student with combined vision and hearing loss. Inherent in the role of intervener, and emphasized directly in all existing training models, is the importance of techniques and strategies to “develop and maintain a trusting, interactive relationship [with the student] that can promote social and emotional well-being” (Alsop et al., 2004).

Competencies developed for interveners and adopted by the Council for Exceptional Children (2010) include items related to all three components of empathy, such as applying attachment theory to encourage mutual affective involvement and encourage social-emotional development, a deep level of understanding of the unique impact of the child’s etiological conditions, and skills in observing, interpreting, and responding appropriately to a child’s communicative behaviors (Alsop, 2004). While presently only two states formally recognize the role of intervener, it is generally recognized as best practice nationally, and comprehensive training materials have been developed for interveners with grant funding support from the US Department of Education, Office of Special Education Programs (Parker et al., 2017).

A unique dissertation study from the field of education and deafblindness (Martens, 2014) and follow-on article (Martens et al., 2014) focused on implementing an intervention model for

“fostering affective involvement” (defined as the mutual sharing of emotions, certainly a form of affective empathy) in teachers or other staff working with children with deafblindness. The study used single-subject design to introduce an intervention model for staff working with a single student, characterized by intensive implementation of a 16-week training and coaching intervention, including video analysis, constructive feedback sessions and role-play. Findings suggested that it is possible to increase affective involvement, cognitively, affectively, and behaviorally, with an intensive training and coaching model. However, results also warned that a decrease in implementation was observed over time, pointing to the need for continuous coaching and ongoing professional development (Martens, 2014).

Given the appropriate training and support, paraprofessionals may actually be in a unique position to foster a positive and empathic relationship with students leading to improved student outcomes across domains. To begin with, paraprofessionals spend more 1:1 time with students throughout the day than other team members, and are in a position to observe subtle behaviors and responses. Perspectives on paraprofessionals often include an assertion that they “know the student best” (Giangreco et al., 2001, p. 492). As compared with teachers, paraprofessionals may also place a stronger value on important non-academic skill domains, including social and other functional intrapersonal and interpersonal skills, as compared with teachers. One study even suggested that, as compared with special and general education teachers, paraprofessionals place a higher level of importance on the teaching of self-determination skills to students with multiple disabilities (Carter & Sisco, 2011). However, the “protecting” and “mothering” traits commonly found in paraprofessionals (McGrath et al., 2010; Tews & Lupart, 2008) reflect a potentially negative manifestation or misdirected application of affective empathy, namely an ableist attitude of pity for students with disabilities. This negative form of affective empathy is also manifest in “personal distress” when exposed to the pain of others, which is self-focused and bears an egoistic motivation (Stetson et al., 2003).

Additionally, research suggests that in terms of their own socioeconomic and cultural backgrounds, paraprofessionals tend to be more congruent with their students than other educational team members. As Chopra and colleagues (2011) point out, “Paraeducators live in the communities where they work, and are culturally, as well as, linguistically more similar to their students; thus they enhance diversity and community connections for the schools” (p. 16). Furthermore, a survey of paraprofessionals own perceptions about their work revealed a general belief that their “experiences with motherhood” and “insiders’ understanding of diverse communities” was an asset to their ability to connect with and provide appropriate services for their students (Abbate-Vaughn, 2007). The potential benefit of parenting experiences was stated by paraprofessionals in contrast to the trend for teachers to be “childless and half of the participants’ age...” (p. 153).

The potential ability for paraprofessionals to take on a more deliberate role in bridging the gaps between the school and home community has not gone unnoticed. A study (Chopra & French, 2004) found that paraprofessional communication with families benefits the successful inclusion of students with disabilities, but only under the guided supervision of teachers who facilitate the maintenance of appropriate boundaries in a collaborative team model (Chopra et al., 2011). As discussed above, while relationships of mutual respect and empathy between paraprofessionals and other team members may also have an impact on the efficacy of the role, there is no research

connecting paraprofessional perceptions of respect with the extent of their own empathic responses with their students.

Research question

The primary aim of this paper is to ask:

- (1) How can empathy curriculum be applied to training needs of paraprofessionals working with students who have multiple disabilities?

Survey and participants

Paraprofessionals working with students with multiple disabilities were surveyed at six center-based self-contained schools specifically serving students with multiple disabilities, in multiple locations in New York State. Additionally, the survey was sent to paraprofessionals working with students with visual impairments and additional disabilities in New York City public schools. The survey was shared with over 150 paraprofessionals in the context of “collecting research data to support a better understanding of paraprofessional training needs”; no compensation was offered to respondents. 32 paraprofessionals voluntarily completed all items in the survey, with the understanding that the information they shared would be anonymous. The survey, accessed via a web link, was estimated to take 2 minutes to complete.

A five-point Likert Scale with responses “strongly agree,” “agree,” “neutral,” “disagree,” and “strongly disagree” was used to quantify respondents’ perspectives on questions related to their role as a paraprofessional.

Questions on the survey are shown in Table 1, linking questions with specific areas of research targeted in each question.

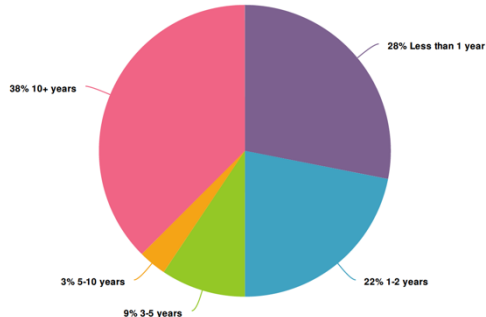
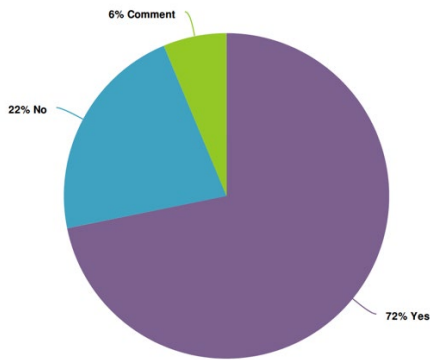
Table 1
Questions

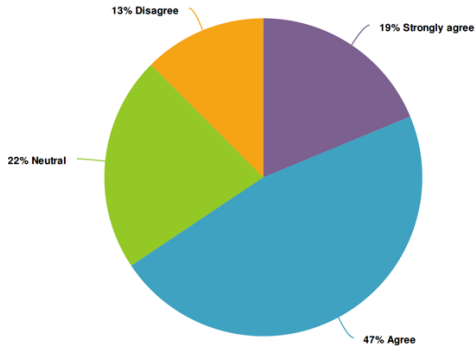
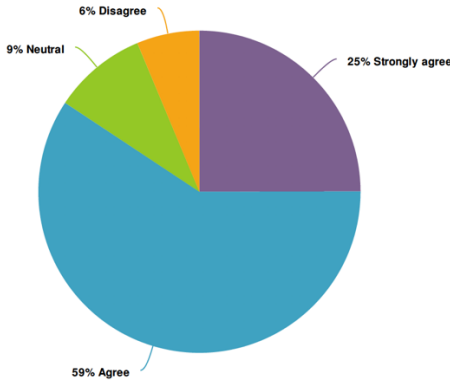
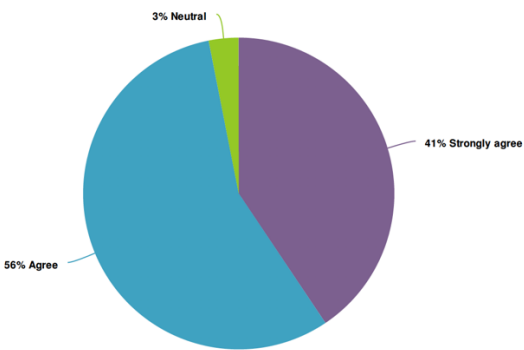
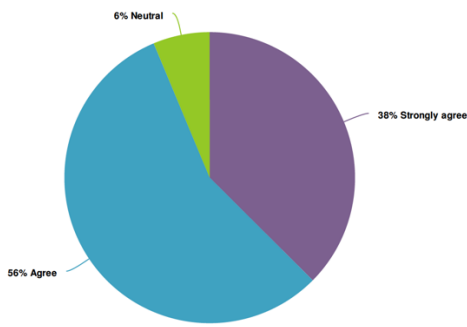
Question	Targeted area of research
1. How long have you been working in the role of paraprofessional? Possible answers: • Less than 1 year • 1-2 years • 3-5 years • 5-10 years • 10+ years	Quantity of experience and exposure to students with disabilities
2. What types of training have you received to support your work with students? (check all that apply) Possible answers: • Paraprofessional/TA roles and responsibilities • Information about my students' specific disabilities • Collaborating and working effectively with teachers • Working with/communicating with families • Prompt levels to use with students • Simulation activities and "seeing the world from my students' perspective" • Communication strategies for working with students • Developing rapport and a trusting relationship with students • Supporting students' self-determination	Extent and content of training Duties/role Cognitive empathy Collaboration/role Affective empathy Behavioral empathy Cognitive empathy Behavioral empathy Affective empathy Affective empathy
3. Have you received individual coaching on how to work with your student from teachers or other team members at your school? (Yes/No/Comment)	Extent of coaching and mentorship
4. I feel that my voice is heard and respected on the educational team. (5-point Likert Scale)	Job satisfaction and self-efficacy
5. I have a strong understanding of my student's experience of the world and the impact of my student's specific disabilities. (5-point Likert Scale)	Cognitive empathy (positive)
6. I have a strong rapport and trusting relationship with my student. (5-point Likert Scale)	Affective empathy (positive)
7. I know how my student is feeling throughout the day, and am able to read my student's emotions well. (5-point Likert Scale)	Affective empathy (positive)
8. I feel upset when my student is upset or in pain. (5-point Likert Scale)	Affective empathy (negative)
9. I have the skills that I need to communicate effectively with and support my student. (5-point Likert Scale)	Behavioral empathy (positive)
10. I would like more training in unique strategies for working with my student. (5-point Likert Scale)	Training needs

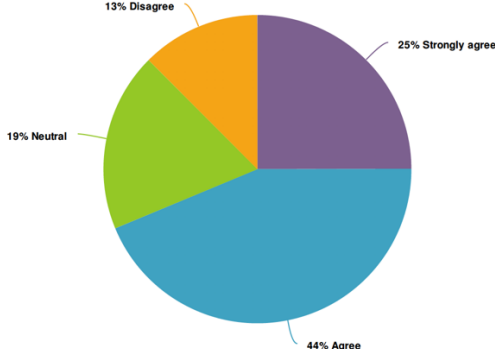
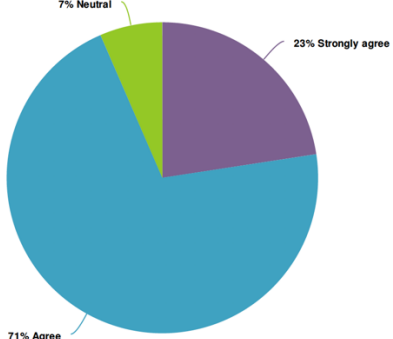
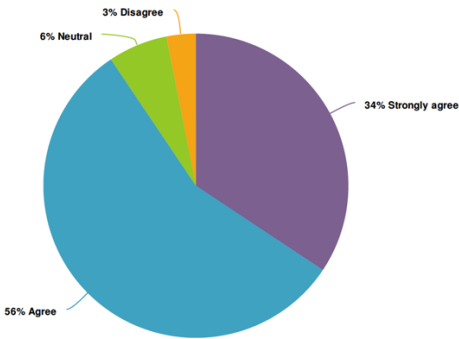
11. Please add any additional comments about your role on the educational team and your work with your student(s). (write-in)	N/A
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Table 2

Survey Results: Results of the survey for all participants (N=32)

Question	Results																																	
1. How long have you been working in the role of paraprofessional?	 <table><tr><th>Value</th><th>Percent</th><th>Responses</th></tr><tr><td>Paraprofessional/TA roles and responsibilities</td><td>93.3%</td><td>28</td></tr><tr><td>Information about my students' specific disabilities</td><td>76.7%</td><td>23</td></tr><tr><td>Collaborating and working effectively with teachers</td><td>73.3%</td><td>22</td></tr><tr><td>Working with/communicating with families</td><td>53.3%</td><td>16</td></tr><tr><td>Prompt levels to use with students</td><td>66.7%</td><td>20</td></tr><tr><td>Simulation activities and "seeing the world from my students' perspective"</td><td>56.7%</td><td>17</td></tr><tr><td>Communication strategies for working with students</td><td>73.3%</td><td>22</td></tr><tr><td>Developing rapport and a trusting relationship with students</td><td>46.7%</td><td>14</td></tr><tr><td>Supporting students' self-determination</td><td>46.7%</td><td>14</td></tr><tr><td>Other - Write In</td><td>3.3%</td><td>1</td></tr></table>	Value	Percent	Responses	Paraprofessional/TA roles and responsibilities	93.3%	28	Information about my students' specific disabilities	76.7%	23	Collaborating and working effectively with teachers	73.3%	22	Working with/communicating with families	53.3%	16	Prompt levels to use with students	66.7%	20	Simulation activities and "seeing the world from my students' perspective"	56.7%	17	Communication strategies for working with students	73.3%	22	Developing rapport and a trusting relationship with students	46.7%	14	Supporting students' self-determination	46.7%	14	Other - Write In	3.3%	1
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	Comments: (1) “sometimes”; (2) Yes, sometimes from certain teachers, I will valuable input (sic).										
4. I feel that my voice is heard and respected on the educational team. (5-point Likert Scale)	 <table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Agree</td> <td>47%</td> </tr> <tr> <td>Strongly agree</td> <td>19%</td> </tr> <tr> <td>Neutral</td> <td>22%</td> </tr> <tr> <td>Disagree</td> <td>13%</td> </tr> </tbody> </table>	Response	Percentage	Agree	47%	Strongly agree	19%	Neutral	22%	Disagree	13%
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Disagree	13%										
5. I have a strong understanding of my student’s experience of the world and the impact of my student’s specific disabilities. (5-point Likert Scale)	 <table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Agree</td> <td>59%</td> </tr> <tr> <td>Strongly agree</td> <td>25%</td> </tr> <tr> <td>Neutral</td> <td>9%</td> </tr> <tr> <td>Disagree</td> <td>6%</td> </tr> </tbody> </table>	Response	Percentage	Agree	59%	Strongly agree	25%	Neutral	9%	Disagree	6%
Response	Percentage										
Agree	59%										
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8. I feel upset when my student is upset or in pain. (5-point Likert Scale)	 <table border="1"> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Agree</td> <td>44%</td> </tr> <tr> <td>Strongly agree</td> <td>25%</td> </tr> <tr> <td>Neutral</td> <td>19%</td> </tr> <tr> <td>Disagree</td> <td>13%</td> </tr> </tbody> </table>	Response	Percentage	Agree	44%	Strongly agree	25%	Neutral	19%	Disagree	13%
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11. Please add any additional comments about your role on the educational team and your work with your student(s). (write-in)	(1) We receive very little meaningful training. (2) Always looking for any additional training and strategies to improve my knowledge with individuals with hearing and seeing loss! (3) I'm a TA my role is help the student to their needs... (4) I love it! Learning more every day. (5) As a paraprofessional, I view my role as an important bridge between the teachers expectations and the students abilities. It is my responsibility to help the student strive to reach educational goals as put forth by the team. Additionally, I help to observe the student and provide feedback for any target lesson areas that are not providing positive results. (6) As a TA at (name of school) I feel that once you step into the school you are a part of the (school) family. Everyone in (name of										

	school) has they own personal role but once we come together as one unit we are UNSTOPPABLE. (7) I like to know that my student are well taking care of while I am assisting in helping to care for them. I believe in doing a great job when it come to my students care and teaching. I believe in treating people the way I would like to be treat. I reach to do excellent work on a daily basics. Team work all the way. (8) As a paraprofessional I am one with my student. It is a great experience that I absolutely love.
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Table 3
Question Results

Question	Empathy Component (implied)	% Agree or Strongly Agree
5. I have a strong understanding of my student's experience of the world and the impact of my student's specific disabilities.	Cognitive empathy (positive)	84%
6. I have a strong rapport and trusting relationship with my student.	Affective empathy (positive)	97%
7. I know how my student is feeling throughout the day, and am able to read my student's emotions well.	Affective empathy (positive)	94%
8. I feel upset when my student is upset or in pain.	Affective empathy (negative)	69%
9. I have the skills that I need to communicate effectively with and support my student.	Behavioral empathy (positive)	94%

The paraprofessionals surveyed (N=32) represented a diverse group in terms of number of years working in the role, and represented diversity geographically across New York State. There did not appear to be any significant correlation between number of years working in the role and extent of training or coaching received by paraprofessionals. The overwhelming majority (94%) reported having received at least some training, though the specific content varied. 81% of respondents indicated having received training in areas related to cognitive empathy; 71% indicated training in areas related to behavioral empathy; and, 63% indicated training in areas related to affective empathy. 50% percent reported having participated in simulation experiences in training, which has been linked in research to tangible outcomes increasing cognitive empathy. The majority of respondents indicated at least some degree of coaching (72% of N=32), and in every group by number of years, except for 5-10 years (likely because of only obtaining one respondent in this group, N=1), indicated between 66-88% "yes" to having received coaching).

Overall, the results indicate that the paraprofessionals surveyed, who all work with students with multiple disabilities, have high self-reported levels of cognitive, affective, and behavioral empathy. There did not appear to be a correlation between number of years working in the role of paraprofessional, and self-reported levels of empathy. Although only 66% of respondents felt that their voice is heard and respected on the educational team, there was no correlation between this item and the respondents' impression of having established a strong rapport and trusting relationship with the student.

As noted above, 69% of respondents indicated that they feel upset when a student is upset or in pain. This was a striking result, as it suggests the significant presence of an egoistic emotional/empathic relationship with students. There did not appear to be a correlation between the number of years working in the role from 1-10, and the negative example of empathic response (feeling upset when the student is upset or in pain). That is, teachers with 10+ years of experience tended to answer "agree" or "strongly agree" at the same percentage as teachers with 1-10 years' experience. It is notable that 50% of the teachers working less than a year in the role indicated "disagree" or "strongly disagree" with this statement; no other group shared this value.

Discussion

The results of the survey answered by 32 paraprofessionals provide additional information on the training and perspectives of paraprofessionals with regard to empathy for students with multiple disabilities. The very high self-reported levels of cognitive, affective, and behavioral components of empathy presented above supports what is understood in the literature regarding the perspectives of paraprofessionals on the quality of their relationships and rapport with students. The results suggest that paraprofessionals working with students with multiple disabilities do receive some degree of in-service training on topics relevant to components of empathy, as well as coaching or mentoring from teachers. It is notable that while 94% reported having the skills they need to communicate with and support their students, 90% indicated that they would also like more training in strategies to do so effectively. It is also important to note that while the training content selection was aligned informally with empathy components, this should not be misunderstood as formal or deliberate empathy curriculum. It appears more likely, based on the literature, that none of the respondents have participated in formalized empathy training.

Responses regarding perceived skill set (Question 9) and perceived need for additional training (Question 10) suggest that even paraprofessionals who have received relevant in-service training and feel effective in their work will benefit from additional, targeted training. This supports the existing research indicating that in general paraprofessionals report a need for more training; notably, this appears to be true regardless of number of years in the field, and extent of training completed. The dissonance between self-reported levels of empathy for students, and self-reported negative affective empathy (Question 8) also supports what the research indicates – that additional targeted empathy curriculum would be useful to paraprofessionals working with students who have multiple disabilities.

The importance of quality supervision by teachers and administrators should again be emphasized as important to support the effectiveness of paraprofessionals. However,

perceptions of being respected and heard on the educational team did not seem to influence respondents' views of their own effectiveness in working with the child. This finding is in conflict with what Biggs and colleagues (2016) reported about the relationship between respect and effectiveness of role implementation. Of course, it is quite plausible that a dissonance exists between perceived effectiveness and actual effectiveness.

Empathy curriculum has not been directly applied to paraprofessional training in the past, but rather in the field of education tends to be applied to pre-service training for administrators and teachers. The research and the results of this study support the need for further direct application of empathy curriculum to paraprofessional training, with the understanding that the majority of paraprofessional training is in-service. There is an inference that existing methods of empathy curriculum would need to be adapted to meet the unique needs and circumstances of paraprofessionals.

Limitations and Implications for Future Research

The results of the survey and review of existing literature support the impression that applying empathy curriculum in the context of targeted paraprofessional training (pre-service or in-service) is a highly relevant topic for future research. The development of specific training models adapted for in-service paraprofessional training is warranted to fill this need. The current research on training suggests that sustained follow-up coaching and mentoring is also critical. Additionally, participants of this survey represent mainly paraprofessionals in self-contained settings serving students with multiple disabilities. These settings ostensibly function in a very different manner than inclusive settings with regard to training and sheer number of paraprofessionals and special educators in the school building

Surveys of teachers working with students with multiple disabilities, as well as of administrators, would be appropriate in order to compare the results. Would teachers express the same degree of negative empathic responses (Question 8) as compared with paraprofessionals, or does the proximity of paraprofessionals to students, and their less objective role with regard to providing instruction, lead to increased emotional attachment in these relationships? The relatively high percentages of participants reporting having received training in areas related to each component of empathy should also be compared with data from the population of paraprofessionals working with students with mild, rather than severe/multiple disabilities.

The question of how empathy curriculum can be applied to training needs of paraprofessionals working with students who have multiple disabilities was addressed primarily through an extensive review of literature. Literature suggests that paraprofessionals are in need of training to enhance their roles on the educational team in general, and that specifically with regard to empathy, they may be in a unique position to develop positive relationships supporting outcomes with their students. Training must be supplemented with coaching by teachers or administrators who have established mutual respect with paraprofessionals. In order for the outcomes of training to be sustained, relevant follow-up training and professional development should be administered on an ongoing basis. Research in the field of empathy curriculum points to ongoing training that includes experiential aspects such as simulation or role-play. Since paraprofessionals largely have congruent cultural and linguistic experiences with their students, they may be at an advantage in terms of capacity for empathy. However, ableist attitudes and

lack of disability-specific empathy training may present adverse impacts. A larger-scale survey of paraprofessionals working with students with multiple disabilities is warranted to more thoroughly investigate current needs in the field. Additionally, intensive research is needed to determine the possible effectiveness of adapting empathy curriculum models to meet the unique contexts of paraprofessionals, in particular through in-service training and coaching.

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About the Authors

Christopher Russell is the Project Coordinator for the New York Deaf-Blind Collaborative, a USDOE Office of Special Education Programs Technical Assistance and Dissemination grant. He has experience as a classroom teacher and Teacher of the Visually Impaired (TVI) working with children who have visual impairments and additional disabilities including deaf-blindness. He is adjunct faculty at Hunter College, CUNY, in the graduate personnel preparation programs for Blindness/Visual Impairment, and Childhood Special Education: Severe/Multiple Disabilities.

Soribel Genao is an Associate Professor of Educational Leadership at CUNY Queens College. Her research has focused on examining the diverse systemic issues in and reform of urban schools while assessing administrative, teacher, and community collaborations that facilitate more positive student academic and behavioral outcomes such as student retention in marginalized communities. She has institutionally lead the development of a dual Masters and certificate in Educational Leadership with an emphasis on Bilingual Education programs at the P-20 level at Queens College. Her national and international work reminds of intersectionality: that is, gender is but one of several identities individuals hold (e.g., ethnicity, racial preference, sexuality) and these identities interconnect to influence each person's experiences, anyone of which can become a negative stereotype.

Teaching Children with SMA 1 to Expressively Communicate Using Augmentative and Alternative Communication Systems: Extending Functional Communication Teaching Using a Model of Verbal Behavior

**Cheryl Ostryn, PhD, BCBA-D, LBA
Center for Applied Behavior Analysis, The Sage Colleges**

Abstract

Spinal Muscular Atrophy is a genetic, degenerative disorder, in which individuals become unable to engage in typical motor activities, including speech. The outcome for the most common type of SMA (Type 1), has previously been death before the age of 2, but new medical improvements are showing promising results for life longevity. Research has demonstrated that individuals with SMA 1 have normal cognitive ability, but there is a total lack of research into teaching them to expressively communicate. For other neuromuscular disorders, it is common for individuals to utilize augmentative and alternative communication (AAC) methods, but unfortunately individuals with SMA 1 have not been included in this population. This study is the first of its kind, as it utilizes the use of picture communication systems for successfully teaching young children diagnosed with SMA 1 to mand for items within the same timeframe as their typically developing peers.

Teaching Children with SMA 1 to Expressively Communicate Using Augmentative and Alternative Communication Systems: Extending Functional Communication Teaching Using a Model of Verbal Behavior

Spinal Muscular Atrophy. Spinal muscular atrophy (SMA) is a genetic disorder that is characterized by a mutation in the survival motor neuron gene 1 (*SMN1*), which renders the gene unable to produce a protein necessary for normal nerve functioning that controls the muscles (Mercuri, et al., 2018). Symptoms of SMA include lack of physical strength, and becoming unable to move, talk, swallow, or breathe as they get older, and lose these skills that are typically present at birth. There are four types of SMA, based on age of diagnosis, with the most severe being Type 1, which is diagnosed within a baby's first six months and often leads to death before age two. SMA affects approximately 1 in every 6000-10,000 individuals, with 1 out of every 6 children diagnosed with Type 1 (Cure SMA, 2018). Over the past few years, there have been medical advances which have decreased the early fatality rate and, in December 2016, the drug Spinraza was approved for use as a treatment for SMA, bringing hope to many families and longevity to those affected (Cure SMA, 2018; Leaffer et al, 2015).

Typically, individuals with SMA 1 are unable to expressively communicate, and teaching alternative and functional forms of communication to young children with this diagnosis is rarely included in the therapeutic goals. Most early intervention programs aim to teach speech, and many individuals with SMA 1 have difficulty producing even single sounds due their medical condition. However, it is important to recognize the distinction between speaking and functional communication. Speaking is making a vocal sound, but functional communication is

communicating with a purpose and having the intent understood by a communicative partner, and does not have to be in the form of speech (Light & Binger, 1998).

Model of Verbal Behavior. Typical children display a clear developmental pattern of functional communication, which is expressed in the form of speech, but it can be expressed in other forms. An overview of communication development starts with toddlers saying single words, typically nouns, known as mands to initiate requests, such as “cup,” “bear,” or “mama.” These nouns then become labels, or tacts, and typically are extended to two words, such as “doggie-big,” “Daddy-go,” with the purpose being manding or attention. All children progress through the same stages for language development in order to be competent communicators (Cooper, Heron, & Heward, 2007; Skinner, 1957; Sundberg & Partington, 1998/2010; Sundberg & Michael, 2001).

It is highly possible that some children diagnosed with SMA 1 can progress through the receptive stages of verbal behavior, but are unable to fully master the expressive stages, not because they have cognitive delays as with developmental disabilities, but because they lack the ability to produce speech sounds due to muscle weakness. For instance, they can understand when someone says, “point to the car” and they may point/gesture/look towards the car, but are unable to vocally request or label “car.” Research indicates that children with SMA 1 have normative cognitive function, and their inability to expressively communicate is not a reflection of their cognitive ability, but their physical challenges, and it is vital that they are given a method for expressing themselves (Leaffer et al., 2015).

Augmentative and Alternative Communication. Augmentative and Alternative Communication (AAC) is a practice in which individuals who do not have the ability to speak, have access to alternative forms of communication (Light & Binger, 1998). Unaided AAC involves communication that comes solely from the individuals, such as American Sign Language, eye movements, or gestures, whereas aided AAC methods involves the use of an external object, such as a voice output device (VOCA), pictures, or a tablet with icons that can be pressed to say words (Beukelman & Mirenda, 1998; Miller & Allaire, 1987). The former methods require adequate motor function, whereas the latter can be adapted for those with motor challenges, such as individuals with SMA 1.

AAC devices can, in a sense, talk for a child in many different formats. Simple AAC systems can involve pointing to a picture of a cup, or handing a picture of a cup to a communicative partner, to ask for “juice,” while more advanced systems involve pressing a button that says a word. Nowadays, the systems are much more advanced thanks to progress in technology, and many individuals are using tablets or smart phones and programming several touch screen button applications, which speak the words when pressed. When applying these systems to individuals diagnosed with SMA 1, the unique abilities and challenges of each individual would need to be assessed in order to decide which system could be tailored for them to expressively communicate.

This study will focus on teaching the first stage of communication to young children diagnosed with SMA 1, known as manding or requesting, by utilizing picture systems. Currently, there is a plethora of significant research with AAC systems for all stages of communication for individuals with a multitude of physical impairments including, cerebral palsy, dual sensory

impairments, genetic syndromes, intellectual disability, hearing impairment, traumatic brain injury, and stroke (American Speech-Language-Hearing Association, 2017). Unfortunately, none of this research includes individuals with SMA 1 due to the degenerative nature of the disorder, the eventual loss of motor function in upper and lower areas of the body, and the high fatality rates (Ball, Fager, & Fried-Oken, 2012).

New medical advancements are changing the outcomes for individuals with this disorder in positive ways. As research demonstrates, many have normal cognitive abilities, therefore, they are now fast becoming prime candidates for using AAC, with some researchers agreeing that AAC should involve the use of pictures for young pre-literate children with SMA 1 (Ball, et al, 2012). As children with SMA 1 are showing physical progress where they didn't before, it would be a disservice to this population not to afford them with communication options that every person deserves for a greater quality of life. For comparison purposes, this study also teaches the same communication methods to a group of participants without a SMA diagnosis, as the control group, to compare results of learning with same-age peers.

This study extends the body of literature pertaining to teaching communication using picture systems to young children with developmental disabilities, and branching out to a new population with the SMA 1 diagnosis. This study has been designed using evidence-based practices, is based on a model of verbal behavior, and applies behavioral principles and teaching methods to a different population; a population with average to above average intelligence, but without the physical ability to make speech sounds. Therefore, the study question is, *what are the effects of teaching expressive mands to young children diagnosed with SMA 1, using augmentative and alternative picture communication systems?*

Pre-Testing and Participants

Pre-Testing. Participants' communication abilities were assessed using the Verbal Behavior Milestones Assessment and Placement Program (VBMAPP), a tool for tracking language delays (Sundberg, 2014). The VB-MAPP protocol was implemented to test the participants' current receptive and expressive communication abilities. This is a thorough assessment based on normative data that identifies the age level of functional communication (not simply vocal communication) skills. The items on the test are a mixture of observations or timed observations, and tasks to complete by direct testing.

Participants. Three children aged 18 months – 3.5 years, diagnosed with SMA 1, with no prior teaching using AAC systems for communication partook in the study as the experimental group. Bindi was 2 years 7 months old, diagnosed with SMA 1 at 5 months old. She could sit for up to 10 minutes at a time in a child seat with straps and a tray, she wore leg braces for several hours per day, she could move her arms above her head, she could point with her fingers, push items back and forth that were placed in front of her, scan within her visual field, and could manipulate some toys that were placed in front of her. Her current vocal speech level was making a few sounds and having a sound that her parents recognized as "all done." She required a suction machine at regular intervals. Bindi's scores on the VB-MAPP were within normal range (18-30 months) for listener and matching to sample skill, and slightly below average (15 – 18 months) for manding (requesting), tacting (labeling), play, and social skills, and below average (0-15

months) for imitation, echoic, and vocal skills. Bindi's VB-MAPP profile demonstrated typical skills in areas that did not require vocal or physical abilities, but were below average on skills that required movement or sound which would be expected given her SMA 1 diagnosis. Bindi was receiving regular physical and speech therapy.

The second participant, Kara, was a 2 year, 1 month old female who was diagnosed at 6 months with SMA 1. Parental reports included that Kara could sit in a specialized chair with straps and padding/cushions for up to 10 minutes at a time, but spent long periods of time lying down on the couch, on mats, and on blankets. Whilst lying sideways, she was able to use her arms to reach out to the side to touch items. She had a grabbing action with her arms and was working on pulling items towards her. She had some ability to turn pages of a book and had good scanning abilities in her visual field. At the parents' choice, Kara participated in the study in a side-lying position. She required a suction machine at regular intervals, and her parents reported that Kara made a particular sound when she was asking for suction, as well as understanding a few other sounds such as all done, needing to move, wanting Daddy and Mommy, and watching her favorite videos. Kara's scores on the VB-MAPP were the same as Bindi's with a slightly lower score on her matching to sample skills. Kara was receiving regular physical, speech therapy occupational, and hydro therapy services.

The third participant, Jackson, was a 2 year 4 month male who was diagnosed with SMA 1 at 6.5 months old. Jackson was able to sit in a toddler booster seat with straps and pillows for support, with a tray, or up against a table on a wooden chair for approximately up to 9 minutes at a time. He wore leg braces for a few hours per day, and he was able to move his arms in front of him and partially to the side. He could partially manipulate items in front of him, but had difficulty in crossing the mid-line, his parents reported his right arm was favored. As with the other participants, he made sounds for immediate needs that his parents and caregivers understood, also required the use of a suction machine, and was also receiving physical, speech, and sacro-cranial therapy. Jackson's scores were similar to the other two participants, but he scored slightly lower at the 15 month level for play and social skills.

For comparison purposes, three children aged 18 months – 3.5 years, without any diagnoses, and no prior teaching using AAC systems for communication, partook in the study as part of a control group. The participants in the control group were selected to match the experimental group in age and sex. Chaya was a two year, 5 month old year old female, who attended a morning daycare 3 times a week, spent her afternoons with either her Mother or grandmother, and attended a ballet class once a week. Talia was a 2 year old female who was at home with her Mother every day, and attended story time at the library twice a week, and a Mommy and Me swim group once a week. Rafael was a 2 year, 2 month old male who attended a full time daycare during the week. All three control participants' scores on the VB-MAPP were within normal range for their ages across all skills.

Methods

Settings, Materials and Accommodations. All sessions were completed in the homes of the participants, with one session per day. Due to the variable nature of SMA 1 characteristics among the participants, physical accommodations were devised for each of them, although the

materials and teaching methods remained the same. Bindi participated sitting in her booster seat with tray on the floor, and her pictures were placed in front of her. Kara participated lying on her right side on a blanket on the couch and her pictures were propped up against a hard surface in front of her, and Jackson sat in his toddler seat at the kitchen table and his pictures were placed in front of him on the right side. When more than two pictures were used, they were placed on a cardboard strip, horizontally for Bindi and Kara, and vertically for Jackson. For all the participants in the control group, they sat at a table and the pictures and items were put in front of them.

Independent Variable / Pictorial Communications. The pictures communication system was the independent variable and the intervention of interest in this study. The pictures of the items were laminated, color, 2 inch x 2 inch, photographs with the name of the item printed underneath. Each one had a small piece of Velcro on which could be attached to a cardboard strip measuring 12 x 3 inches. Minimal Velcro was used for adhering the pictures to the strip so it would be easier for the participants to pull off if desired. The items and pictures were the same for all the participants and supplied by the principal investigator. These were a range of commonly bought toys for ages 19 month-3 years, made by companies such as Fisher-Price™ and V-Tech™. They had sounds, buttons, and some had moving parts. Identical toys owned by the participant were to be taken out of the study, but this was only the case for a total of 4 toys for Chaya and Rafael.

Dependent Variable. The dependent variable were the communications elicited by the participants using the picture system; the mands that were asking for the toys. These would differ between the experimental participants due to their physical needs, but the communicative function of all the participants remained the same; asking for a tangible item.

Study design. A multiple-baseline design across three experimental participants, and three control participants was used, with two phases; (i) baseline and (ii) intervention with two pictures (Kennedy, 2005). The participants had staggered baselines ranging from 4-6 days, acting as their own control. The intervention phase involved an explicit instruction model with a least-to-most prompting hierarchy, which consisted of (i) expectant look at picture, (ii) gesture to picture, (iii) partial prompt of a body part leading towards picture which was adapted for each experimental participant dependent on their mobility, and (iv) full physical prompt of a body part to select the picture dependent on their mobility. There were 10 trials in a teaching session for each mand. This intervention that has been similarly used in several other studies for teaching picture communication systems (Names removed for review).

Baseline. The participants sat or laid in the selected position for the study and the investigator sat either across or next to the participant, for the control group, the participants sat at a table diagonal to the investigator. The investigator put out two pictures and the two corresponding items in front (side for Jackson) of the participants, making sure everything was within reach. To increase motivation, items were visually and auditory stimulating, e.g., cause and effect parts, noises, moving parts, and flashing lights. The investigator did not prompt the participant to use the pictures to mand for the items, but simply left everything in place for 15 seconds. The participant was free to play with the item or not. Baselines were recorded for 4, 5, and 6, days for all participants.

Picture Communication Intervention. Prior to the first intervention trial, the investigator set up the environment for the teaching model. The participants and the investigator sat or laid in the same positions as the baseline phase. The principle investigator set up the pictures and items in front of the parent or caregiver so the participant could see and the parent/caregiver pointed to a picture and then investigator said “yes, you can absolutely play with that toy,” smiled, and gave the toy to the parent/caregiver, who happily played with it for 20 seconds. Then the investigator put the same two pictures and items in front of the participants as in the baseline phase, but this time, if the participant went to touch the item, the investigator implemented the prompting procedure to use the picture to request the item. Once the request was made by the participant (prompted or independent), the chosen item was given to the participant to play. If prompting was required, the investigator would say phrases such as “oh, you wanted that toy,” or “oh you are pointing to the toy you want to play with,” and if the response was independent, the investigator would say phrases such as, “yes, you can absolutely play with that toy,” or “thanks for showing me which toy you wanted.” The investigator or parent could then play for 1-2 minutes with the participant, talking about the toy, and creating a natural play scenario, or assist the participant with the toy, such as putting the coins in the piggy bank. The praise was higher if the response was independent. After the first three independent, consecutive responses with two pictures and two items, the items were removed from sight and the trials continued with the participants selecting only from the pictures. Mastery was when the first 3 spontaneous responses were correct for 3 consecutive sessions.

Results

Experimental Group. Figure 1 displays the data for the experimental group, with prompt level 1 being the highest prompt, and prompt level 5 being an independent response. All of the participants scored zero in baseline indicating that did not use the pictures to expressively communicate. Once the teaching phase began, the skill of utilizing the pictures to expressively mand for items took between 3-5 sessions for all three of them. The teaching sessions for Bindi at trials 5-7, required full prompting, and so an additional teaching prompt was introduced; a vocal instruction. After Bindi received the vocal instruction, “point to the picture of what you want,” she demonstrated that she understood how to utilize the pictures to gain access to the desired items, as the rest of her data demonstrated independent responses. At the 19th trial, she pushed the pictures away and parent delivered suction. Once suction was completed, Bindi returned to independent manding with pictures. At the end of trial 42, Bindi requested “all done” with a sound recognized by her parent, so the session was terminated. Bindi met mastery criteria at trial 33 (minus baseline trials), but as trial 19 required prompting, due to requiring suction, in order to be conservative, there was an additional session added.

Kara did not require any additional training beyond the initial model with a parent to demonstrate independent manding with pictures. To ensure consistency with the adapted procedure from Bindi’s training, the investigator did give the same vocal instruction after trial 8, but there was no change to her responses. After trials 14, 20, and 32, Kara communicated “all done” using a sound recognized by her parents, so her sessions were terminated. The early terminations did not affect Kara reaching mastery at trial 23, or her 17th trial of participation due to missed trials (minus baseline trials).

Jackson required partial and full prompts at trials 7-11, after the delivery of the initial model, and the additional vocal instruction at trial 9. The investigator and his parents discussed that having Jackson reach out and gesture/point to the pictures may have been too difficult for him in his sitting position. Therefore, a physical adaption was made. The investigator placed a yellow square of paper where Jackson rested his hand on the tray/table, and then would present each picture and item to him in turn. When he saw what he wanted he had to tap the square. This greatly reduced the extra effort to reach out and point to a picture, but still allowed him to communicate what he wanted using a picture. The investigator and the parent modeled this new response after trial 11 and before trial 12, and Jackson was then able to respond independently, with mastery at trial 33, or his 32nd trial of participation due to one missed trial (minus baseline trials).

As the participants all mastered the skill of manding with pictures so quickly, the study was extended to include an array of up to six pictures, increasing by one picture once mastery was achieved. The mastery criteria was three consecutive independent responses, and the same prompting methods were utilized if necessary. All three participants partook in the extended phase of the study. Bindi mastered using six pictures, Kara mastered three pictures, and started four, but left the study due to health concerns, and Jackson mastered using five cards, and was two thirds of the way to mastering six cards, but had to leave the study due to family commitments. He required suction at trial 49 so two additional trials were implemented for the three card array.

In terms of sessions in the study, Bindi mastered using two pictures in 5 sessions, and mastered up to using six pictures in three additional session. Kara mastered using two pictures in 3 sessions, and mastered using three pictures in 4 sessions, and Jackson mastered using two pictures in 4 sessions, and mastered using five pictures in 6 sessions as a means to communicate. As the participants met mastery criteria early in the sessions, the number of trials per session could have been stopped earlier than ten, but the participants did not express wanting to end and were eager to see the new toys brought by the investigator, so it was decided to keep the original number of trials for practice with such high motivation, as well as for consistent data collection. However, some sessions were ended early due to participants' requests.

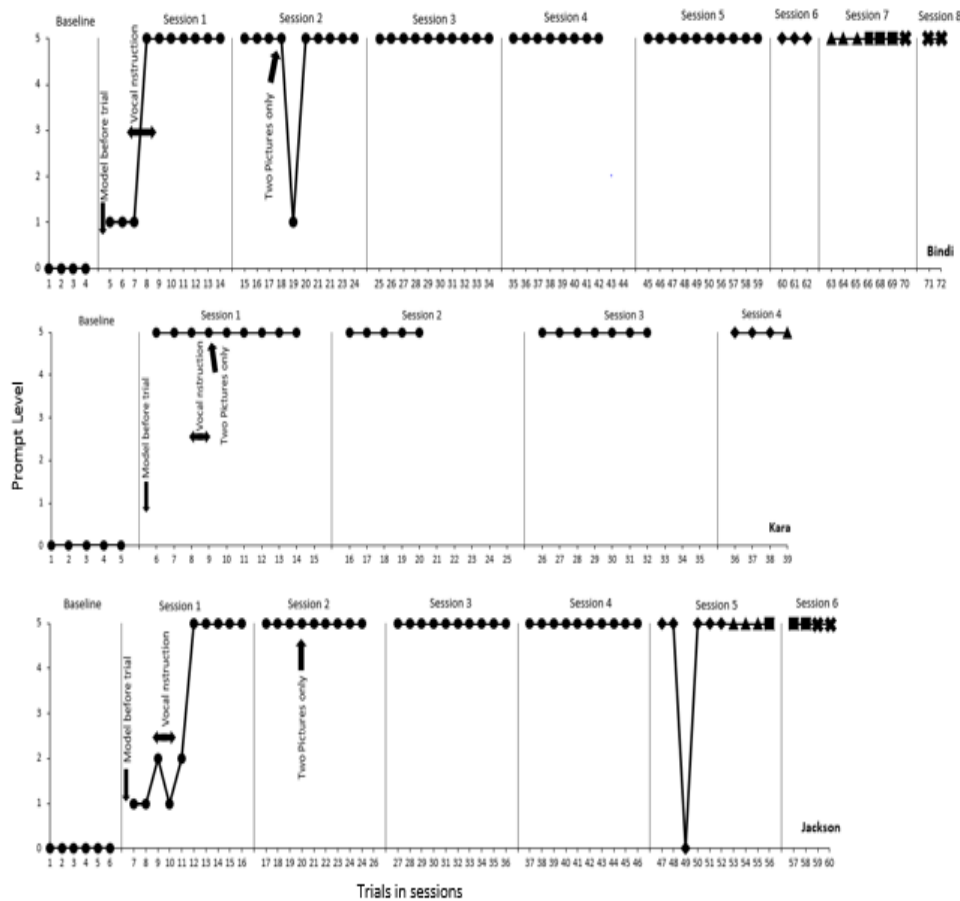


Figure 1. Baseline and intervention responses utilizing a picture communication system for manding for young participants diagnosed with SMA 1.

♦ Array of 3 pictures ▲ Array of 4 pictures ■ Array of 5 pictures ★ Array of 6 pictures

Control Group. All of the control group participants also scored zero in baseline indicating that did not use the pictures to expressively communicate. Once the teaching phase began, the skill of utilizing the pictures to expressively mand for items took between 3-4 sessions for all three of them. With the subtraction of the number of baseline sessions, the control group participants achieved mastery criteria at trials 23, 33, and 33, and it is notable that no trials were missed for any control group participants. The data for both groups can be viewed in Table 1.

Participant	Baseline trials	Model before trial #	Vocal instruction before trial #	Two pictures only at trial	Trials to mastery / Sessions to mastery
Bindi ¹	4	5	7	14	43 ⁺ / 5
Kara ¹	5	6	8	4	17 ^{*^} / 3
Jackson ¹	6	7	9	14	32 [*] / 4
Chaya ²	4	5	7	4	23 / 3
Talia ²	5	6	8	14	33 / 4
Rafael ²	6	7	9	14	33 / 4

Table 1. Comparison of results for participants with and without a SMA diagnosis.

¹ participant with SMA 1 diagnosis

² participant with no diagnosis

* didn't complete 10 trials in session 2

^ didn't complete 10 trials in session 3

+ didn't complete 10 trials in session 4

Interobserver agreement and treatment reliability. Interobserver agreement of the dependent variable was calculated by 2 coders watching the recorded files of the sessions and scoring whether the correct response was given by the participant. Reliability was 100%. Procedural fidelity was recorded using the same manner and by scoring the procedure by a predetermined checklist of item, and 100% was achieved. It is not surprising that 100% was achieved on both measures as (1) the sessions were recorded and therefore a permanent record was available for review if any disagreement, and (2) the dependent variable, were very distinct behaviors to record.

Discussion and Future Research

This study sought to look at the effects of using pictures to communicate manding for items for young children diagnosed with SMA 1. Figure 1 shows that all three participants learned to use the pictures as mands in a few sessions. One of the participants required a physical adaption to succeed, one required an additional vocal instruction, and one did not require any modifications and was able to use the system independently after watching the model. Furthermore, all three participants were able to extend their skills and continue asking independently using up to six pictures.

This study is the first of its kind with a population diagnosed with SMA 1, so the only comparison for the results are in published studies using pictures to communicator for same age children with developmental disabilities, or comparing to same-age children without disabilities. When reviewing the literature for children with autism and developmental delays, both their receptive and expressive skills are typically delayed. Therefore, this is not a fair comparison as the participants in this study had only slightly lower than average receptive skills, and their low expressive skills could be attributed to their physical delays which prevented them from partaking in typical age-appropriate activities, and being able to access speech, and not developmental delays (Names removed for review).

As discussed earlier, as children with SMA 1 may have average to above average cognitive abilities (Leaffer et al., 2015), it is important to compare the participants results with same-age peers with the same cognitive abilities but without medical or developmental delays to assess the effectiveness of the intervention. Therefore, included in this study was a control group in which participants without any diagnoses underwent with the same experimental methods. The results indicate that the experimental and the control groups had similar results, when allowing for the missed trials. Two of the participants from each group had the items removed and only pictures in view at their 14th trial, while for the other participant in each group, it was at their 4th trial. One participant from both groups reached mastery in 3 sessions, while one in the experimental group, and two in the control group reached mastery in 4 sessions, and one in the experimental group achieved mastery in 5 sessions. The overlap and closeness in these number demonstrate that two of the participants with SMA 1 were able to learn and utilize the picture communication system in a very similar timeframe as their same-age peers without SMA. One participant required only three more trials, due to the decision to collect her data conservatively, and three more trials amounts to approximately an additional 6 minutes of remaining in the study; minimal difference.

Normative Communication Development. In light of these comparative results with normative data, it is important to further look at how typical development occurs in toddlers without disabilities, and how applications can be made with individuals with SMA 1. There is certainly some variation in information, but conservatively, 18 month olds have approximately 20 - 40 single mands (mama, dada, cup, bear), and by two years old, this has grown to approximately 60 - 100 words, with some 2 word combinations, such as “want bear,” and “up mama,” mainly still mands for items or attention. Two year old can understand an average of 400 words and can add 10 new words to their vocabulary each day (Owens, Jr., 2020; Shelov & Remer Altman, 2019; Sundberg, 2014; Sundberg & Partington, 1998/2010). However, there is much more to being a competent communicator than simply being able to speak words (Light & Binger, 1998).

Toddlers without disabilities are also able to demonstrate non-vocal communication, they have good joint attention, they are aware of feelings and sounds around them, they seek out loved ones, they understand and use tone correctly, and they can partake in social play and group activities. Similarly, the experimental participants in this study demonstrated many of these typical skills during their pre-testing. They had typical joint attention, they were receptive to voices and sounds around them, they enjoyed attention from loved ones, they used movement, sounds, eye gazes, and some body movements to communicate their wants and needs as best they could, given their physical challenges; skills that are typically absent for those with cognitive or developmental delays (Sundberg & Partington, 1998/2010; Sundberg & Michael, 2001).

A typical toddler would quickly learn that they could gain access to a candy by saying “candy,” and they would unlikely need any formal teaching to successfully use this request. After the first time of saying the word and gaining the item, their behavior of saying candy would be reinforced over and over again as they repeated this manding behavior to obtain their sweet treat. They would also be able to generalize asking for other items by name as their attempts for candy were successful, and hence, this is the way young children learn typical language, from their responses being reinforced across environments. This natural learning process occurs very quickly,

allowing vocabulary to grow daily (Cooper, Heron, & Heward, 2007; Skinner, 1957; Sundberg & Partington, 1998/2010; Sundberg & Michael, 2001).

In a similar vein, the participants in this study showed no to little time required for learning how to ask for the items, mirroring typical communication development. Bindi needed a vocal instruction as opposed to a physical prompt, but this was a limitation of using an evidence-based prompt system for children with lower receptive skills and a lower ability to understand and follow instructions. Bindi was more typical in her receptive communication and could follow the direction that was added to the procedure, again mirroring typical communication development; a typical two year old could easily follow a vocal direction of point to a picture. In Jackson's case, the data demonstrates that it was not the manding skill that was too difficult for him, but the physical effort required to make the communication response that was required of him, and once accommodations were made he was able to access the picture system to ask for items. The data for all three participants demonstrates that learning how to use pictures to communicate was not difficult to learn, even when pictures were added, and utilized once they understood what to do and once the correct physical accommodations were in place, at the same or very similar rates as their same-age peers without any medical or developmental disabilities.

Physical Barriers. This study highlights that the physical limitations for individuals with SMA 1 are the barriers to communications. None of the participants had ever been offered an alternative communication system, their parents had never been presented with this option for exploration, but all participants received regular speech therapy. It would be possible for speech therapy to continue for these participants in conjunction with using an alternative system, such as a picture system on a device for communication.

The concern for these individuals is that their receptive skills, social, and emotional abilities are similar to their same-age peers, yet they are unable to expressively communicate as their same age peers without SMA 1 diagnoses. This could potentially lead to frustration, sadness, loneliness, and depression: imagine not being able to ask for a toy, or watch a movie, or ask for a drink when you are thirsty (Zach, Yazdi-Ugav, & Zeev, 2016). Alternative forms of communication can break down these physical barriers and allow individuals with SMA 1 to take a more active role in their lives. It is unclear at this time how medical advances will fair for individuals with SMA 1, but for those living longer than previously expected, they deserve the right to be able to communicate to the greatest extent possible.

Limitations Based on previous studies using picture to communicate, (Names removed for review), some of the protocol was adapted for this study. For instance, instead of teaching each picture in isolation and then putting them together for discrimination, it was decided for these study participants to start with two pictures. This was due to the fact that they had some rudimentary forms of communication and their scores on the VBMAPP were within normal limits unless there was a physical component required for scoring.

The main limitation for this study, and any individual using an alternative form of communication, are the physical accommodations. These need to be thoroughly researched so a system is created that requires maximum output with minimal effort and input required from the individual. A further limitation of this study was the use of such basic pictorial communications.

Nowadays, there is so much access to technology that a full communication system can be accessed on a smart phone or tablet. However, this study was designed to demonstrate that young children with SMA 1 can use pictures to communicate, and can communicate their needs by utilizing an alternative system to speech.

Future Directions. This study has introduced the potential for children to expressively communicate using a picture system and opens up a entire line of research; one that could significantly alter the lives of individuals living with SMA 1 and their families. This population could potentially be given a catalyst in which to expressively communicate and participate more fully in life. Giving a child, who was not previously able to express him/herself, a way to communicate, really needs no further explanation of how enormous and far-reaching the effects on quality of life could be. Future directions could continue to teach communication based on a model of verbal behavior and continue to expand children diagnosed with SMA 1's communication skills to afford them the educational and social opportunities that they may not have otherwise been able to access.

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About the Author

Dr. Cheryl Ostryn received her doctoral degree in Special Education (focus on Autism and Applied Behavior Analysis) from The Pennsylvania State University and completed her post-doctoral work at The University of Colorado, Denver. She is a Board Certified Behavior Analyst-Doctoral (BCBA-D), a Professor of Applied Behavior Analysis at The Sage Colleges, and a Licensed Behavior Analyst in New York State. Dr. Ostry has published in several scientific journals, the Young Exceptional Children Monograph series, the Autism Advocate, co-authored a chapter on functional academics, and has presented her research both nationally and internationally. Her main research interests include teaching functional communication to individuals with disabilities using a model of Verbal Behavior, and she has recently extended this grant-funded work into the area of Spinal Muscular Atrophy. She also owns a behavioral therapy company in Colorado.

What School Psychologists Should Know About Multiple Sclerosis

**Ashley N. Phillips, Doctoral Student
Denise E. Maricle, Ph.D.**

Texas Woman's University

Abstract

Multiple sclerosis is an inflammatory autoimmune disease that attacks the central nervous system through the destruction of myelin. Frequently cited symptoms include cognitive impairment as a hallmark repercussion, neuropsychological executive dysfunction, and psychosocial disturbances, such as affective disorders and fatigue. Other symptomatology includes physical deficits, language delays, increased school absenteeism and dropout rates, and diminished academic achievement. MS is primarily observed in young adults, between ages 20 to 40 years; however, 3% to 10% of all individuals with an MS diagnosis experience the onset of this disease before age 18. With the etiology of MS still unclear and its manifestation and progression unpredictable, interventions and supports must be frequently evaluated by a treatment team to ensure continued effectiveness for the individual's cognitive and physical abilities, language development, and psychosocial needs. Additionally, the caregivers and family of the child or adolescent with MS should be incorporated when serving the child.

Keywords: multiple sclerosis, pediatric-onset multiple sclerosis (POMS), demyelination, cognitive impairments, psychosocial, physical deficits, interventions, therapy

What School Psychologists Should Know About Multiple Sclerosis

Overview

Multiple sclerosis (MS) is a multifaceted, autoimmune disease that targets the central nervous system (CNS) with its incidence most prominent in young adulthood between ages 20 and 40, with age 24 generally being the peak of incidence (Zuvich, Mccauley, Pericak-Vance, & Haines, 2009; Cappa, Theroux, & Brenton, 2017). While the onset of MS primarily occurs in young adults beyond typical school ages, 3% to 10% of all individuals with an MS diagnosis experience the onset of this disease before age 18 (Cappa et al., 2017). Childhood is a critical developmental period in terms of neuronal and CNS growth, any complications or damage to the neurons or CNS in the pediatric population have detrimental long-term ramifications. MS damages the myelination process and networks involving cognition, which yields compromising effects in individuals such as inflammation, demyelination, and axonal damage (Amato et al., 2016). Such damage contributes to reported cognitive impairment that is experienced by approximately one-third of patients with pediatric-onset multiple sclerosis (POMS; Amato et al., 2016). The cognitive fragility of the pediatric population highlights the detrimental effects resulting cognitive impairments can have on their adaptive and academic functioning.

Beyond cognitive impairments, the damage MS does to the CNS manifests as muscle stiffness, paralysis of involved extremities, fatigue, and psychological problems, all of which affect a person's occupational and academic performance, social engagement, and daily functioning (Yu & Mathiowetz, 2014). Physical deficits and symptoms are frequently the most notable features of

MS; however, Goretti et al. (2010) discussed the less studied and often overlooked psychosocial issues experienced by children and adolescents with MS. The need to understand such issues contributes to the role comprehensive treatment teams can play in executing the most appropriate assessments, referrals, and treatment plans for their pediatric clients. As this disease implicates an individual's cognitive, academic, psychosocial, and occupational capabilities, it is crucial to examine and understand its mechanisms and ramifications so as to support clients with MS in an effective and holistic manner.

Etiology and Genetic Basis

To fully understand and begin formulating a holistic approach to working with individuals with MS, its roots must first be understood. The first recorded observance of MS was documented by Professor Jean-Martin Charcot in the nineteenth century wherein he named it *sclerose en plaques* (Jancic et al., 2016). While the first clinical description of this disease was documented in the nineteenth century, the exact etiology of MS has eluded the progression of time. MS is multifaceted not only in its symptomology and impairments, but also in its etiological framework. Jancic et al. (2016) surmised that autoimmune, genetic, and environmental factors contribute to its development. Within the realm of genes, the most significant genetic factors attributed to the development of MS are changes in the human leukocyte antigen (HLA) DRB 1 gene (Jancic et al., 2016). The process through which MS occurs is traced back to the destruction of myelin that results in the formation of CNS plaques made up of inflammatory cells and their products (Ghasemi et al., 2017). Myelin sheath death stems from multifocal zones of inflammation due to focal T-lymphocyte and macrophage infiltrations and oligodendrocyte death (Ghasemi et al., 2017).

Environmentally speaking, the Epstein-Barr virus (EBV) infection, low vitamin D levels, and smoking may be contributing factors, environmental triggers, or causal factors for the onset of MS (Jancic et al., 2016). Infection causes the immune system to activate autoreactive T lymphocytes, later differentiating into T helper (Th17) cells that can pass through the blood-brain barrier (BBB) and react with autoantigens, myelin antigens, or oligodendrocytes (Jancic et al., 2016). These Th17 cells then cause inflammation of the CNS, as well as the migration of other T cells through the BBB, and activate macrophages (Jancic et al., 2016). A trademark of MS involves inflammatory demyelination, which is caused by the production of proinflammatory cytokines that damage myelin and oligodendrocytes during the immunological response to the infectious agent (Jancic et al., 2016). MS leads to the development of brain atrophy causing diminished brain volume, with the beginning stages consisting of multiple lesions primarily in the cerebellum and brainstem (Jancic et al., 2016).

The etiological complexity of MS extends to its heterogeneity, incomplete penetrance, temporal changes, polygenic inheritance, environmental risk factors, and genetic predisposition (Zuvich, Mccauley, Pericak-Vance, & Haines, 2009). Additional layers of this disease's complexity come in the form of a lack of predictability due to the location, size, and duration of the lesions, which can lead to a broad spectrum of variable symptoms (Zuvich et al., 2009). Consequently, this variability in symptoms also occurs among attacks or episodes of MS throughout its progression (Zuvich et al., 2009).

Prevalence and Inheritance

As the etiology of MS is both unclear and dynamic, its inheritance pattern follows in a similar fashion. Previously, MS was believed to be sporadic in nature; however, research has shed light onto genetic contributions and the prevalence of this disease. Broadly, the prevalence of MS within the general population is approximately 0.1% to 0.2%; however, this prevalence rate is variable depending on other factors, such as familial MS presence, race and ethnicity, and gender. Regarding familial factors, first-, second-, and third-degree relatives of individuals with MS experience an increased prevalence of MS, with first-degree relatives experiencing a 2.5% to 5% risk of developing MS (Cappa et al., 2017). This risk is further increased in terms of monozygotic twins wherein it reaches a 25% to 30% concordance rate compared to the 3% to 5% rate in dizygotic twins (Cappa et al., 2017). Furthermore, siblings of individuals with MS are at a heightened risk for developing MS when there is a history of both an earlier age of MS onset and a parent with MS (Cappa et al., 2017).

Research has found that race and ethnicity play a role in the prevalence of MS, with increased prevalence in northern European ancestry than in other ethnic groups (Cappa et al., 2017). Additionally, race and ethnicity potentially influence the phenotype of adult-onset MS; specifically citing a relationship between African ancestry and a more rapid disabling disease course, as well as a higher relapse rate in African American pediatric-onset MS (Cappa et al., 2017). Within the United States population, pediatric-onset MS (POMS) and adult-onset MS share a similar racial and ethnic distribution (Cappa et al., 2017).

Looking more narrowly at the pediatric population, the prevalence rate, disease onset, and experience of the first MS attack varies between younger and older children. Sex differences show that the age of symptom onset is slightly higher in girls, primarily occurring within adolescence at age 15, and age 16 for boys (Belman et al., 2016). These sex differences in disease onset are most prominent in adolescents from ages 12 to 17 (Belman et al., 2016). Discriminant clinical features between younger and older children include antecedents before the first MS attack, with younger children presenting with encephalopathy and having more motor and coordination problems and older children having more sensory symptoms (Belman et al., 2016). Support has also been found for the potential role sex hormones play in the immunological process that occurs in the onset of MS in adolescent girls (Belman et al., 2016).

Oksenberg and Baranzini (2010) noted that the inheritance of MS is influenced by several risk factors, such as interactions with infections and pathogens, climatic and other environmental variables, and an individual's ancestry and family history hold a strong influence over the risk of developing MS. While the prevalence and inheritance of MS are influenced by several interacting variables, its familial recurrence and presence among twins do not demonstrate a Mendelian trait pattern (Oksenberg & Baranzini, 2010). Taken together, Mendelian traits are inherited through dominant and recessive alleles; however, as MS presents as a non-Mendelian trait it is considered polygenic and involves more than one gene and incorporates a spectrum of phenotypes (Oksenberg & Baranzini, 2010).

Cognitive and Neuropsychological Implications

Cognitive dysfunction is exceptionally important in pediatric onset MS (POMS) due to the ability to preserve physical status early in disease onset, as well as the heightened vulnerability to cognitive impairment children experience in the beginning of the disease process (Parrish & Fields, 2019). Cognitive impairment is also a fundamental symptom of POMS that can develop early within disease progression and frequently occurs prior to the manifestation of severe physical impairments (Till et al., 2013). Cognitive impairment prevalence occurs within 30% to 50% of the pediatric MS population, with risk factors to such impairment being disease onset at a younger age, increased T2-weighted brain lesion volume, and reduced global and regional brain volume (Till et al., 2013). Across several studies, the most common impairments included complex attention, poor naming, receptive language, visuospatial memory, tests of verbal ability, and weaker abilities on facial recognition of affective states, identification of beliefs, and knowledge of others (Amato et al., 2016). These cognitive impairments can be difficult to detect as assessment strategies are muddled by the variety of abilities that can be affected by MS, thus requiring a comprehensive battery (Amato et al., 2016).

The complex relationship between cognitive impairments from the disease process and the disease's repercussions on school involvement due to high absenteeism was demonstrated through the impact MS has on learning, academic functioning, language development, and general daily functioning (Parrish & Fields, 2019). POMS also compromises social and school functioning through high absenteeism, the need for special education services and accommodations, grade retention, or school dropout (Parrish & Fields, 2019). Cognitive impairment also played a role in the experience of fatigue, depression, poor quality of life, comorbid psychiatric disorders, sleep disturbance, and deficits in social skills development (Amato et al., 2016; Parrish & Fields, 2019). In a cyclical effect, increased cognitive impairments and high absenteeism can result in poorer academic success, and higher fatigue levels; comorbid psychiatric disorders interact and can worsen preexisting cognitive impairments; and deficits in social skills and diminished quality of life can also exacerbate cognitive impairments through increased absenteeism resulting in fewer opportunities for learning and to receive accommodations.

Within the umbrella diagnosis of MS, there are subtypes of the disease that correlate with a discreet pattern of cognitive deficits (Katsari et al., 2016). The authors noted that the degree and extent of cognitive impairment relates to either disease duration, course, or severity (Katsari et al., 2016). Cognitive deficit profiles differ between chronic progressive MS (PPMS) and relapsing remitting MS (RRMS) in that PPMS patients demonstrate deficits in verbal fluency, comprehension, information-processing speed, cognitive flexibility, and abstraction (Katsari et al., 2016). Patients with secondary progressive multiple sclerosis (SPMS) have more reports and/or greater severity of cognitive impairments compared to the other subtypes (Katsari et al., 2016). RRMS is characterized by prominent verbal fluency and visuospatial memory deficits, while PPMS was linked to impaired processing speed (Katsari et al., 2016). This information is pertinent in terms of implementing proactive interventions. A student with MS may not be referred for special education services if their cognitive deficits are not manifesting in such a

detrimental manner; however, knowing that a student has an MS subtype can lead a teacher or school psychologist to implement proactive supplemental interventions tailored to support that student's unique neuropsychological profile

Nunan-Saah et al. (2017) demonstrated the interconnectedness of executive dysfunction, anxiety, depression, fatigue, and lower quality of life experienced by children with MS. Executive functions include attentional control, working memory, mental flexibility, planning, and goal-directed behavior; these functions are especially vulnerable to destructive interferences caused by MS due to the nature of their neural networks (Nunan-Saah et al., 2017). Executive dysfunctions also share an association between anxiety and depression, specifically, with anxiety being associated more with performance on executive functioning tasks than depression; however, higher levels of depressive symptoms were linked to increased self-reported problems with executive functioning in daily life (Nunan-Saah et al., 2017). Sources for interventions for children and adolescents with MS are encouraged to target depression, anxiety, fatigue, and quality of life as this may yield improvements in executive functioning (Nunan-Saah et al., 2017).

Psychosocial Implications

Children with MS experience diagnoses of major depressive disorder, anxiety and panic disorders, bipolar disorders, adjustment disorders, and behavioral problems such as increased aggression towards family and peers, isolation, and reports of sadness and insecurity (Goretti et al., 2010). The detriments go beyond the physical body of the child by impairing school activities, attendance, academic achievement, involvement in sports and personal hobbies, and social relationships (Goretti et al., 2010). Preventative and remedial strategies should reach beyond the physical symptoms and difficulties of MS and seek to reduce these psychosocial and behavioral difficulties, such as minimizing the side effects of medication, encouraging the open expression of feelings, fears, and difficulties, and involving the child in health care decision-making (Goretti et al., 2010).

The psychosocial piece of the holistic puzzle is often overshadowed by the physical deficits of MS, which calls for deeper evaluations of affective disorders in children and adolescents with MS. Such disorders can manifest as physical symptoms and be attributed to the disease, therefore leaving the true affective disorder undiagnosed and unattended. School psychologists, faculty, staff, and other involved personnel must check in with children and adolescents with MS and monitor their social emotional wellbeing and tailor recommendations and interventions to the child's emotional difficulties. As school attendance and extracurricular activities are impaired by MS, it is crucial that school psychologists and other mental health practitioners work with the child and family to find other outlets for social relationships and opportunities for feelings of engagement and autonomy to develop.

Treatment of MS and support services for children with MS must expand its scope to address the role fatigue and comorbid disorders play in the impairments of the disease and functional outcomes. These psychosocial problems influence the child's academic, social, and vocational functioning as the authors found that individuals with psychiatric diagnoses had a higher rate of cognitive impairment (Parrish & Fields, 2019). Research has also pointed out a recent trend in the identification of social functioning disorders, like autism spectrum disorder (ASD), and

related this occurrence with the impact MS has on social skill development in children (Parrish & Fields, 2019). The case may be that social functioning and the processing of social information may be affected by the progression of the disease, resulting in ASD-related symptoms and characteristics.

Taking a step back, MS can also significantly impact families of individuals with MS by creating additional stressors on each family member and family functioning in general (Uccelli, 2014). In working with children and adolescents with MS, a holistic approach incorporates the caregivers, parents, and future relationships the individual with MS may have. Parent caregivers demonstrate the highest levels of depression, lower quality of life, psychological distress, and decreased work hours and/or unemployment (Uccelli, 2014). Parents of children with MS also report less satisfaction with their parenting role, lower parenting competence, and increased worry (Uccelli, 2014). Parents and caregivers are pivotal members in the multidisciplinary treatment team and influence the child's overall health and development. To fully support the child or adolescent with MS, their family members and caregivers must feel supported, included, informed, and equipped with effective coping strategies.

Clinical Treatment and Management

Pediatric MS bears a higher disease burden at onset and throughout progression of the disease, as well as increased T2 lesion volumes, early thalamic atrophy, and increased frequency of relapses (Yeh, 2012). Physical impairments are slow to accrue while cognitive impairments, such as deficits in executive functioning, processing speed, working memory, and attention, are exhibited earlier in disease progression (Yeh, 2012). Due to this significant disease burden, Yeh (2012) argued that early intervention with disease-modifying therapies (DMTs) is imperative in decreasing the likelihood of presentation with a third clinical relapse (Yeh, 2012). Yeh (2012) offered insight into potential impediments that may occur when treating pediatric MS, such as treatment failure and the resulting need to change therapies, non-adherence to treatment regimes, the occurrence of breakthrough disease, and switching therapies through the introduction of alternate agents. Yeh (2012) also discussed the use of symptomatic treatments for affective disorders, fatigue, and spasticity.

Comprehensive Interventions and Supports

MS goes beyond impairing a person's neuropsychological functioning and seeps into their social relationships with family and peers, employment, quality of life, and daily functioning (McCabe et al., 2015). Literature has pointed out the deficits in supporting MS patients and their families through education services, psychological resources, and peer support (McCabe et al., 2015). Education on symptom management and treatment options can be empowering to patients, though age and symptom severity influence their perception of freedom and their needs for education on symptom management. The unpredictability and addition of new symptoms creates feelings of grief and loss in family members and partners of patients with MS, as well as feelings of uncertainty and lower levels of self-control in the patients themselves (McCabe et al., 2015). There is an increased need for accessibility to information on how family members and individuals with MS can manage their emotions and physical stress, as well as psychological services and counseling to support life adjustments, deterioration of relationships, and feelings of

depression and anxiety (Uccelli, 2014; McCabe et al., 2015). Peer support was another area that patients with MS felt was unmet in terms of relevance and accessibility, with gender, age, and symptom severity influencing satisfaction with peer support programs and services (McCabe et al., 2015).

As MS targets the CNS and manifests through several physical impairments, various physical and occupational struggles are to be encountered by children and adolescents with MS (Yu & Mathiowetz, 2014). Such deficits and impairments can be supported and ameliorated through occupational therapy interventions and rehabilitation, such as endurance and strength exercises, motor training, and establishing a balance between personal, occupational, and environmental factors (Yu & Mathiowetz, 2014). Occupational therapy-related interventions for people with MS include rehabilitation programs, such as outpatient, inpatient, and home-based programs, fatigue management courses through face-to-face or online formats, and health promotion programs that emphasize one's individualization and self-perception of health-promoting behaviors (Yu & Mathiowetz, 2014).

Working with individuals with MS within the school setting and afterwards entails regular evaluation and assessment of their disease presentation, symptoms, and impairments as MS is a long-term disease with variable implications (Beer, Khan, & Kesselring, 2012). Progress goals set by treatment teams should be frequently referenced and assessed to adapt and adjust treatment modalities and interventions. Physical therapy interventions and supports focus on improving or restoring physical abilities and can include the use of exercise to improve motor functions, balance, gait, muscle power, and exercise tolerance, as well as gait training through treadmill usage, hydrotherapy, and hippotherapy through horseback riding (Beer et al., 2012). Occupational therapy focuses on the restoration and maintenance of adaptive independent skills used for everyday living and incorporates task acquisition, the use of adaptive equipment, and the modification of the individual's environment for personal, domestic, and community tasks (Beer et al., 2012). Speech therapy can target respiratory exercises to improve the client's articulatory capacity, swallowing training, and expiratory muscle strength training for voice production (Beer et al., 2012).

As MS can yield cognitive deficits, cognitive interventions frequently target attentional deficits, communication, and memory and have been shown to improve memory span, working memory, and immediate visual memory (Beer et al., 2012). MS also involves psychosocial deficits that can be supported through psychological services, such as the use of cognitive behavioral therapy (CBT) (Beer et al., 2012). Research has shown that CBT demonstrated improvements in depression, positive affect, fatigue, and overall quality of life (Beer et al., 2012).

Conclusion

MS is a demyelinating, autoimmune inflammatory disease that damages the CNS, resulting in a diverse and variable spectrum of symptoms, presentations, and deficits in an individual's cognitive, psychosocial, physical, and academic functioning. This disease is complex in its etiology, inheritance pattern, and progression; however, its onset primarily occurs within young adulthood between ages 20 to 40, with peak incidence in age 24 (Zuvich, Mccauley, Pericak-Vance, & Haines, 2009; Cappa, Theroux, & Brenton, 2017). A target population for school

psychologists and school personnel involves the 3% to 10% of all individuals with an MS diagnosis who experience the onset of this disease before age 18 (Cappa et al., 2017).

As this disease is unpredictable in its symptomatology, progression, and severity, it is crucial for medical and mental health professionals, school personnel, and caregivers to be cognizant of the deficits and difficulties that children and adolescents are currently facing and could potentially encounter in the future. Understanding these deficits also implies being knowledgeable of treatment modalities, interventions, supports, and accommodations that are comprehensive. These supports and interventions should also be uniquely tailored and specific to the client's current physical and cognitive ability level, language capabilities, psychological needs, and their personal goals. While the individual with MS is of central importance, their family and caregivers should also be accounted for as they provide support to the child or adolescent with MS and are influential over the child's development.

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Increasing Independent Toileting in Children with Autism Spectrum Disorder and Other Developmental Disabilities: A Systematic Review

**Vicky G. Spencer, Ph.D, BCBA-D, LBA
Meghan Ello, M.S., BCBA, LBA**

Shenandoah University

Abstract

Being able to independently and correctly complete a toileting routine is an important developmental milestone for all children, but for children with Autism Spectrum Disorder (ASD), it may be an extremely difficult skill to acquire (Keen et al., 2007). The focus of this review was to examine the effectiveness of the current research on three common interventions including video modeling, the modified intensive toilet training method (MITTM), and parent-delivered toilet training for increasing in-toilet voiding in children with ASD. Nine single-subject design studies were identified from 2009 to 2019. The overall results of the toilet training intervention studies have shown the procedures reviewed to be effective in increasing in-toilet voiding. Future research should focus on replicating and expanding these interventions, but also combining these interventions to see if the effects would produce more positive results for children with ASD and toileting issues.

Increasing Independent Toileting in Children with Autism Spectrum Disorder and Other Developmental Disabilities: A Systematic Review

Completing a toileting routine is an important daily life skill for all children and is certainly not a new area of research. Appropriate toileting is a vital developmental milestone for children with Autism Spectrum Disorder (ASD) to meet but may be a difficult skill for these children to acquire (Keen et al., 2007). Learning the skill of in-toilet voiding can be a challenging task for children with ASD, because they often have a difficult time identifying the need to go to the bathroom (Cicero & Pfadt, 2002). Because individuals with ASD tend to need more assistance in toilet training, they may require a more rigorous approach to toilet training (Azrin & Foxx, 1971; Duker et al. 2001). Individuals that are not toilet trained may experience a social stigma, personal health challenges, and other life setbacks, due to the absence of these skills (Cicero & Pfadt, 2002). Research has found that lack of toileting skills can often be a burden to parents (Keen et al., 2007).

Lott and Kroeger (2004) stated two fundamental goals in toilet training: to be able to recognize the need to go to the bathroom and to be able to independently complete the toileting behaviors. In 2009, Kroeger and Sorensen-Burnworth completed a review on teaching toileting skills to individuals with developmental disabilities, including children with ASD, and found that the most frequently recommended approaches are based on modified versions of Azrin and Foxx's (1971) rapid toilet training (RTT) method. The RTT method includes the use of punishment procedures and was often implemented in institutionalized settings. Presently, the use of punishment procedures has been considered unethical (Keen et al., 2007). Therefore, the move from punishment procedures to reinforcement-based procedures dictated the focus and the range

of years included in the review. Further, the interventions could be implemented in the participant's everyday environment.

The purpose of this literature review was to examine the effectiveness of the current research on video modeling; the modified intensive toilet training method (MITTM), also known as Rapid Toilet Training (RTT); and parent-delivered toilet training interventions for increasing in-toilet voiding in children with autism. The research explored throughout this review focused on providing details on the procedures implemented and the results of these three different interventions. The authors chose to identify and analyze the research that had been published since Kroeger's 2009 critical review on toileting training individuals with autism and other developmental disabilities.

Method

Literature Search Procedures

The following search procedures were used to retrieve relevant studies for the review. A computer-assisted search of four major databases was conducted including *EBSCOhost*, *Google Scholar*, *Science Direct*, and *Wiley Online Library* from 2009 to 2019. The following descriptors were used: *toilet training*, *modified rapid toilet training*, *parent-implemented toilet training*, *video modeling*, and *autism*.

Criteria for Inclusion

Nine studies were identified during the period from 2009-2019 in the following journals: *Journal of Developmental and Physical Disabilities*, *Journal of Intellectual Disability Research*, *Behavior Analysis in Practice*, *Education and Training in Autism and Developmental Disabilities*, *International Electronic Journal of Elementary Education*, and *Research in Developmental Disabilities*. The four main criteria for inclusion in this literature review included: (a) single subject designs published between 2009 to 2019; (b) studies that included reinforcement-based practices to teach toilet training; (c) individuals diagnosed with ASD or other developmental disabilities; and (d) interventions intended to increase toileting acquisition.

For the purpose of this review, studies were excluded when punishment was part of the procedures (Sadler & Merkert, 1977; Smith, 1979), or when the participants did not have ASD or other developmental disabilities (Greer et al., 2016). Studies were excluded when they did not specifically target urination, or they only focused on bathroom-related behaviors such as drying hands, arranging shoes, covering buttocks, and tucking shirt (Ohtake & Takahashi, 2015). Many of the studies used strategies to increase both in-toilet voiding and toileting behaviors; these studies were included if they met the four main criteria stated above (e.g., Cocchiola et al., 2012; Drysdale et al., 2014; Frank et al., 2019; Lee et al., 2013; McLay et al., 2015).

Sample

Pooling the data from all studies reviewed, a total of 27 participants with Autism Spectrum Disorder or other developmental disabilities were included in these studies involving 24 boys and three girls. For those reporting, students had a mean age of 4.4 years (range 2.6 to 8.1). The median total number of subjects per study was three, ranging from one to five participants.

Research Design

All nine studies included in the review employed a single-subject research design. Three studies employed multiple baseline designs (Drysdale et al., 2014; Frank et al., 2019; Rinald & Mirenda, 2012), two studies used a non-concurrent multiple baseline design (Doan & Toussaint, 2016; McLay et al., 2015), and one study used a concurrent multiple baseline design (Cocchiola et al., 2012). Ardic and Cavkaytar (2014) implemented a multiple probe design, and in the final two studies, Kroeger and Sorensen (2010) used an ABA design while Lee et al. (2013) used a changing-criterion design.

Intervention Descriptions

Toilet Training and Video Modeling

Video modeling is an intervention that involves showing an individual the target behavior through the use of videos. The idea of video modeling is that the learner will eventually imitate the target behavior (McLay et al., 2015). According to Delano (2007), video modeling may take advantage of the child's possible strengths in visual processing and his or her common interest in watching videos. These two advantages may increase the likelihood of the child's ability to model behavior.

In 2007, Keen et al. examined the use of video-modeling for teaching toilet training. Using a commercially produced video, Keen et al. (2007) investigated the effectiveness of video modeling in teaching day-time urinary control to five children with autism. The results showed that video modeling in conjunction with operant conditioning may be more likely to increase toileting skills than when using operant conditioning alone for toilet training. However, the children did not achieve full toilet training. The study was not included in the review since it did not meet the criteria for inclusion based on the year of the study.

Following the research of Keen et al. (2007), Lee et al. (2013) utilized a similar approach using a toilet training video model. A changing-criterion design was employed to examine the effectiveness of video modeling using a customized video to toilet train a child with ASD. In addition, the intervention included toileting behaviors such as initiating use of the toilet, sitting on the toilet, pulling pants up and down, and flushing the toilet.

The participant in this study was a 4 year, 6 month old boy with ASD, and the intervention took place in his home. Pre-baseline data were utilized to identify an elimination schedule. While baseline data were collected, a toileting task analysis was introduced to the participant. Before the scheduled toileting times, the participant watched the video model. The child was then prompted to verbally request the toilet with the use of a picture card, and prompting was provided as needed to complete the steps in the task analysis.

The participant was provided with tangible reinforcers on completion of any of the six steps in the toileting task analysis. He was also provided with tangible reinforcers when mastery criteria were met for steps in the task analysis that were currently being targeted. The results of this study proved successful for teaching the toileting behaviors that could be seen in the video model (i.e. walking to the toilet, undressing, sitting on the toilet, redressing, and flushing). However, he did not master eliminating in the toilet which was the one step that was not actually shown in the video model.

As shown above, the previous research was inefficient at teaching in-toilet voiding, leading Drysdale et al. (2014) to attempt the use of an animated video model incorporating in-toilet voiding into the video model. Thus, the use of animation allowed for all steps in the toileting process to be depicted that would otherwise be considered inappropriate to record using a live model. This study examined the effectiveness of using a custom-made video model including animations to teach toileting skills. The participants in this study included two boys with ASD, a 4 year old and a 5 year old. A multiple baseline across behaviors design was employed with subjects seen in the participant's home. Baseline consisted of identifying an elimination schedule for each participant and creating a toileting behaviors task analysis. The toileting behaviors included walking to the toilet, undressing, sitting on the toilet, in-toilet eliminations, redressing, and flushing the toilet.

During the intervention, the participants were shown the video model right before their scheduled elimination time. The video was incrementally introduced to the participants playing two steps at a time. Researchers employed the use of a chaining procedure allowing the participants to be prompted on the toileting behaviors that were not currently being targeted. Each instance of independently finishing a step in the task analysis independently was met with verbal praise. The results showed that both participants were successful in learning the behaviors involved in toileting as well as having actual in-toilet voiding. Although, it is not completely clear of the role that the use of animation played in the success of teaching all of the steps, including the actual in-toilet elimination, the use of animation in video modeling may be more suited to teaching more sensitive behaviors.

Finally, in the last study identified using video modeling for teaching toilet training, McLay et al. (2015) investigated the implementation of a video-modeling intervention package to toilet train two children with ASD. A non-concurrent multiple baseline design across participants was employed at both of the participant's homes. The participants in this study included two non-verbal boys with ASD, ages: 7 years, and 8 years old. The procedures of the video modeling intervention package utilized animation to depict in-toilet voiding combined with prompting and reinforcement. A bathroom schedule and a toileting sequence task analysis was created for each participant. During the intervention, the video was played in segments for each step in the task analysis that the child was learning. Once the child met acquisition criteria of all steps, the full video was played before the child went to the bathroom. In conjunction with video modeling, prompting was implemented when necessary, and reinforcement was provided for following the steps in the toileting sequence and for in-toilet voiding. The results of this study indicated that video modeling, including animation, combined with prompting and reinforcement were effective in teaching in-toilet voiding, and toileting behaviors.

Toilet Training and Modified Intensive Toilet Training Method

As noted earlier, the RTT method, or the ITTM, was introduced by Azrin and Foxx in 1971 and included the use of punishment procedures. Additionally, it was often implemented in institutionalized or clinical settings. Over time, researchers began examining ways to modify the RTT method that removed the use of aversive consequences and focused on more positive

procedures (Cicero & Pfadt, 2002). It is now referred to as the modified intensive toilet training method (MITTM).

Since the passage of the Individuals with Disabilities Education Act, 2004 (IDEA, U.S. Department of Education, 2004), schools have been charged with addressing student behaviors necessary for functioning in schools, such as toileting, and not just academic skills but are functional life skills. Although there is a vast amount of literature regarding toilet training, few studies deal directly with the issue of toilet training in school settings. In 2012, Cocchiola et al. developed a school-based toilet training program for preschoolers and demonstrated the effectiveness of interval toilet training for children with autism and developmental delays. The participants included five boys with ASD or other developmental delays between 3 and 5 years of age. A concurrent multiple baseline across participants design was implemented in the participant's preschool classroom.

Baseline data were collected prior to the start of the intervention while the participants were still wearing diapers. At the start of the intervention, participant's diapers were removed, and their fluid intake was increased. The participants were brought to the bathroom at 30-minute intervals to sit on the toilet until they voided or up to 3 minutes. Reinforcement was provided for in-toilet voids, while accidents were met with "You wet your pants. You need to change" and researchers would remain neutral while changing the participants and restarting their bathroom interval timer. The bathroom intervals were increased throughout the intervention for participants to learn to hold their bladder. The results of this research indicate that the toileting intervention was effective at increasing toileting behaviors within a school setting.

In 2014, Ardic and Cavkaytar, examined the implementation of the MITTM on teaching toileting skills to children with ASD. These procedures were different in that they did not include the three components of the original method. The modifications included a reduction in the duration of the procedures from eight hours to six hours, a device was not used to detect urination, and overcorrection was not used. A multiple probe design using probe sessions across subjects was implemented at the participant's special education center. The participants included three males between 3 and 4 years of age.

The intervention consisted of increased fluid intake, dry checks, reinforcement for dry pants, or in-toilet voids. The students were given the instruction "go to the toilet." The participants were brought to the toilet every 30 minutes, reinforcement was provided for every 10 minutes the participant had dry pants, if the participants were not dry during the dry check the researcher stated, "you are not dry," removed any reinforcers, and changed the child with a neutral affect. Once the participant left the special education center for the day and went home, parents initiated one trip to the toilet with the participant after 1 hour and 50 minutes of being home with the intent to decrease in-home accidents. The results indicated that the MITTM was a successful method for teaching these children with ASD to in-toilet void and keep dry pants. Further, the elimination of the three components of the Azrin and Foxx (1971) study did not have a negative impact on the results of this study by Ardic and Cavkaytar (2014).

In 2019, Frank et al. extended on the previous research conducted by Cocchiola et al. (2012) in a naturalistic educational setting and followed the general protocol that was used in Cocchiola et

al.'s study. This study examined the effects of a decision protocol to individualize toilet training interventions based on each participants' needs. The participants in this study were three preschool boys with disabilities, all 4 years old. A delayed multiple baseline was implemented in the participant's classroom. The decision protocol aimed to assist researchers and participant's parents in selecting which intervention (interval toilet training (ITT) or RTT) would best suit their child throughout the intervention and adjust the intervention as needed. Parent support, classroom resources, and progress based on the decision protocol were all context variables that were considered in choosing the toileting intervention. Interval Toilet Training consisted of a participant sitting on the toilet every 30 minutes until a child had an in-toilet void, or 5 minutes had passed, while RTT consisted of the participant sitting on the toilet until an in-toilet void occurred in which the participant could earn time away from the toilet. The choice of intervention could be modified from ITT to RTT, or vice-versa if the researchers did not see skill acquisition on the target behavior. The results of the study indicated that the use of an individualized decision-protocol in-conjunction with either interval or rapid toilet training were effective at increasing in-toilet voids and decreasing accidents.

Parent-Implemented Toilet Training

Although some of the studies that have been examined do include parent involvement as part of the study (Ardic & Cavkaytar, 2014; Drysdale et al. 2014; Lee et al. 2013; McLay et al. 2015), three of the studies focused on parent training. Because of the difficulty children with ASD are frequently faced with when it comes to generalization of skill acquisition, Kroeger and Sorensen (2010) evaluated the effects of using a parent-delivered, intensive toilet training protocol in the child's home. This intervention consisted of implementing a modified version of Arzin and Foxx's (1971) RTT protocol. The participants in the study included two boys with ASD ages, 4 years, 11 months, and 6 years, 4 months.

Using an ABA design, the intervention was implemented by the parents in the participant's home bathrooms. Parents were trained on the intensive toileting protocol before the start of the intervention without the use of punishment procedures, such as positive practice, environmental restitution or verbal reprimands. The participant's fluid intake was increased prior to the start of the intervention. At the start of the intervention the participants were required to engage in scheduled sitting on the toilet with scheduled break times. Verbal and physical redirection (i.e., "We go pee-pee on the toilet.") towards the toilet was used if the child began having an accident while on break. In the event of an in-toilet void, the child was provided with preferred tangible reinforcers and verbal praise. As participants began responding independently, they were then required to have scheduled sits in a chair. Instead of sitting on the toilet, they sat near the toilet. The sitting protocol was ceased when the participants met mastery criteria. Results indicated that a parent implemented toilet training protocol was effective in teaching and maintaining toilet training.

Following Kroeger and Sorensen's (2010) research, Rinald and Mirenda (2012) examined the effectiveness of implementing a modified RTT workshop to parents of children with developmental disabilities including ASD. A multiple-baseline design across two participant groups was employed at the participant's home. The participants included six children (three girls and three boys) who were between the ages of 3 and 5 years old, and one parent for each

child. The intervention was split into three phases: baseline, a modified-RTT parent training workshop, and parent implementation of the modified-RTT procedures.

Parent training consisted of a four-hour program where parents were trained on the modified-RTT protocol which included training on scheduled toilet sittings, increased fluid intake, reinforcement for in-toilet voids, an accident protocol, and the procedure for scheduled chair sittings for toilet initiation, as described by Kroeger and Sorensen (2010). Throughout the parent-implemented intervention, the participants sat for timed scheduled sits on the toilet. If the participant independently voided in the toilet, the sit time was decreased, and the time off the toilet was increased. Parents were then taught to introduce scheduled chair sits, near the toilet, once the child had three-consecutive in-toilet voids. If the child had an out of toilet elimination, parents were instructed to bring the child quickly to the toilet to finish the elimination. If the elimination was finished inside the toilet, the child was praised and provided with reinforcement. If the elimination was not finished inside the toilet, parents changed the child and remained neutral. Parents were provided with the researchers contact information for answers to any additional questions during the course of the study. The results revealed that a parent-delivered toileting intervention was effective at increasing in-toilet urination. Additionally, a unique contribution of this study was the workshop on teaching parents to toilet train their children using role playing and video examples.

In the final study on parent training reviewed, Doan and Toussaint (2016) researched the effectiveness of the RTT program that was tailored to parental preference. Specifically, parents were given the option to exclude two common toilet training components (Azrin & Foxx, 1971), a urine alarm and positive practice. A non-concurrent multiple baseline across participants was employed across both the clinic setting and the participants homes setting. The participants were three boys with ASD between the ages of 2 and 5 years old.

The researchers collaborated with the participant's parents to create individualized toileting interventions. All three of the participant's parents chose not to use the urine alarm while all parents elected to use positive practice. However, one of the parents chose not to continue the use of positive practice after one implementation. The intervention consisted of increasing participant's fluid intake, an elimination schedule, reinforcement for in-toilet eliminations, and communication training which consisted of prompting the child to request the bathroom. Positive practice was utilized if the participant had an accident. They were reminded "no wet pants" and brought to sit on the toilet. The results indicated that this intervention was effective at increasing self-initiations and decreasing out of toilet eliminations. Thus, developing an individualized intervention protocol that includes both practitioners and parents may increase the chance of a positive outcome for the child.

Discussion

Review of the literature indicates that overall results reveal that there are toilet training interventions that can increase in-toilet voiding for children with ASD and other developmental disabilities. Of the nine studies identified, eight of the interventions were effective at teaching in-toilet voiding, while the one study (Lee et al., 2013) that was ineffective for in-toilet voiding,

was still effective at teaching toileting behaviors to children with ASD. All of the studies approached toilet training without the use of the punishment procedures utilized by Azrin and Foxx (1971), although Doan and Toussaint (2016) did use one of the punishment procedures, positive practice. Of the findings presented in this review, the research suggests that a modified version of Azrin and Foxx's RTT that removes or reduces the punishment procedures to teach toileting behaviors, including in-toilet voiding, can be an effective alternative for children with ASD and other developmental disabilities.

Of the three studies that implemented video modeling as an intervention, Lee et al. (2013) created a custom-made video model which was implemented in combination with a toileting task analysis. Results showed that the intervention was ineffective at teaching in-toilet voiding, although it was effective at increasing the behaviors involved in toileting. Based on those findings, Drysdale et al. (2014) and McLay et al. (2015) expanded on the intervention by using an animated video model alongside a toileting task analysis. This proved to be effective at teaching in-toilet voiding and toileting behaviors. Further, the use of an animated video provided the privacy needed to teach sensitive behaviors such as toileting.

In addition to video-modeling toilet training procedures, three studies focused on MITTM in educational settings. Cocchiola et al. (2012) developed a school-based toilet training program for preschoolers with autism and developmental delays, while Ardic and Cavkaytar (2014) examined the implementation of the MITTM on teaching toileting skills to children with ASD in a special education center. They found the use of the MITTM to be an effective measure at teaching toileting skills. In the third study, Frank et al. (2019) extended on the previous research conducted by Cocchiola et al. (2012) and Azrin and Foxx (1971), in a naturalistic educational setting and found the use of a decision-protocol to be effective at increasing in-toilet voids and decreasing accidents.

The final three studies included in the review focused on parent-implemented toilet training interventions in the participant's home. The studies reviewed included a parent-delivered, modified-RTT protocol (Kroeger & Sorensen, 2010) while Rinald and Mirenda (2012), following a four-hour modified RTT workshop to parents of children with ASD and other developmental disabilities, had the parents implement the toileting procedures. In the third study, Doan and Toussaint (2016) were effective at teaching toileting behavior using a RTT program that was tailored to parental preference. Although research is limited, it is encouraging to show that parents can potty train their children with ASD and other developmental disabilities at home using research-based protocols. Table 1 provides a synthesis of the studies.

Table 1
Increasing Independent Toileting in Children with ASD and other Developmental Disabilities

Citation	Participants	Design	Intervention	Results
Ardic & Cavkaytar (2014)	N= 3 Autism Ages= 3, 3, & 4	Multiple probe across subjects design	Intensive Toilet Training	Intervention was effective at increasing in-toilet voids

Cocchiola, Martino, Dwyer, & Demezzo (2012)	<i>N</i> = 5 Autism, & Developmental Disabilities Ages = 4, 4, & 6	Concurrent multiple baseline across participants	Intensive Toilet Training in public school	Intervention was effective at increasing toileting behaviors
Doan & Toussiant (2014)	<i>N</i> = 3 Autism Ages = 2, 4, & 5	Nonconcurrent multiple baseline design	Parent-Oriented Rapid Toilet Training	Intervention was effective at increasing in-toilet voids
Drysdale, Lee, Anderson, & Moore (2014)	<i>N</i> = 2 Autism Ages = 4 & 5	Multiple baseline across behaviors design	Video Modeling	Intervention was effective at increasing in-toilet voiding
Frank, Kim, & Fienup (2019)	<i>N</i> = 3 Developmental Disabilities Ages = 4, 4, & 4	Delayed multiple baseline design	Intensive Toilet Training Decision-Protocol	Intervention was effective at increasing in-toilet voids
Kroeger & Sorensen (2010)	<i>N</i> = 2 Autism Ages = 4 & 6	ABA across subjects design	Parent-training model	Parent-delivered toilet training was an effective intervention
Lee, Anderson, & Moore (2013)	<i>N</i> = 1 Autism Age = 4	Changing criterion design	Video Modeling	Intervention was ineffective at teaching in-toilet voiding
McLay, Carnett, Meer, & Lang (2015)	<i>N</i> = 2 Autism Ages = 7 & 8	Non-concurrent multiple baseline across participants design	Video Modeling	Video-modeling intervention package was effective at teaching toileting skills
Rinald & Mirenda (2012)	<i>N</i> = 6 Autism Ages = 3, 3, 3, 3, & 5	Multiple baseline across two participant groups design	Parent-Implemented	Modified RTT implemented by parents was effective at increasing in-toilet voids

Limitations and Future Research

As with any review of research, there were limitations to be noted. With multiple interventions being studied it is hard to assess which would be the most effective for toilet training. Many of the interventions were very time consuming, and often required an entire bathroom to be

available for the child which is not always feasible. Unfortunately, no matter which intervention is implemented, the process of teaching in-toilet voiding will always require multiple steps.

Only three studies were identified utilizing video modeling for toilet training between 2009 to 2019. Due to the limited research, the overall effectiveness of using video modeling for toilet training is still difficult to assess. Research has yet to be done using video-modeling independently as the only procedure in an intervention. Future research should attempt a video modeling intervention independently from chaining procedures. Further, research should focus on replicating and incorporating modified methods of video modeling to teach in-toilet voiding. Researchers should examine a cost-effective way to create and display a toileting video model. Due to privacy issues, the entire toileting routine cannot be displayed on a video model without the use of animation, fortunately Drysdale et al. (2014) and McLay et al. (2015) had success with this process.

Regarding the participants in this review, only three girls were included in the study conducted by Rinald and Mirenda, 2012. Although statistics show that boys are four times more likely to be diagnosed with autism than girls (Center for Disease Control, 2018), it is just as critical to include girls in evaluating the most effective methods of teaching toilet training. Further, these studies included preschool age children, but there are older children, teens and adults with ASD and/or developmental disabilities that are unable to toilet independently. There is a need for future research in this area as well.

Finally, each of these interventions are promising and has the potential to be a successful approach for children with ASD and other developmental disabilities. Thus, it is surprising that the research is limited in this area since toileting is a basic life skill that has to be taught to every child with or without disabilities. Replication of these studies is essential if our goal is to increase independence. Although this research may be time consuming, we need to consider whether the benefits outweigh the difficulties in conducting research in this area. The answer is “Yes, it does.”

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About the Authors

Vicky G. Spencer, Ph.D, BCBA-D, LBA, is a Professor in the Department of Psychology at Shenandoah University (SU) in Winchester, Virginia. She has over 25 years of experience as a university professor and researcher. Dr. Spencer's areas of research include behavioral management strategies, cognitive learning strategies, and inclusive practices for all people.

Meghan Ello, M.S., BCBA, LBA, is a recent 2019 Master's graduate in Applied Behavior Analysis at Shenandoah University in Winchester, Virginia. She is currently employed as a BCBA at Continuum Behavioral Health in Northern, Virginia. She is passionate about working with both children and adults, as well as their families, to help facilitate a meaningful change utilizing evidence-based ABA interventions.

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