



# Barriers to Educator Implementation of a Classroom-Based Intervention for Preschoolers With Autism Spectrum Disorder

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There is considerable need for adoptable evidence-based interventions for implementation in public classrooms serving children with autism spectrum disorders (ASD) during the preschool years, an important period in neurodevelopment. Barriers to implementation, including gaps in teacher education, contribute to the research-to-practice gap, and may compromise child outcomes. This qualitative study collected ongoing verbal and written feedback from educators ( $n = 8$ ) and administrators ( $n = 3$ ) during their participation in the iterative development phase of a larger project to translate and preliminarily trial an evidence-based intervention, Early Achievements, in public preschool classrooms. Using a grounded theory-based approach, barriers were identified in areas of educator preparedness, engagement, and cohesion, complexity of instructing students with ASD, limited time/resources, and administrator support. Educators and administrators differed in their perspectives. Innovative strategies are presented for enhancing transportability, along with discussion of implications for teacher education practices and related policy.

**Keywords:** autism spectrum disorder, classroom, barriers, pre-service training, implementation

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## INTRODUCTION

The research-to-practice gap has been widely described and lamented in the fields of education and special education. This gap is especially troublesome for children with autism spectrum disorders (ASD) given the rising prevalence of the diagnosis (i.e., 1 in 59 children; Baio et al., 2018), the multiple developmental systems affected, and the social and communication impairments that impede learning of foundational skills needed for school readiness. In addition, the extensive special education needs of children with ASD place considerable demand on educational resources (Lavelle et al., 2014).

Several intervention approaches have demonstrated efficacy in clinical or home-based settings where research staff, trained to high levels of implementation fidelity, implemented the intervention (e.g., Dawson et al., 2010; Kasari et al., 2010; Landa et al., 2011). However, few evidence-based interventions for young children with ASD have been translated successfully into feasible models for application in authentic early education environments, where educators have varying amounts of experience with ASD (National Research Council, 2001; Bondy and Brownell, 2004; Stahmer et al., 2005). In addition to these challenges, difficulty obtaining educator buy-in and high levels of fidelity of implementation (i.e., degree to which intervention was implemented as

intended; Dykstra Steinbrenner et al., 2015; Stahmer et al., 2015) further contribute to low adoption of evidence-based interventions in public school classrooms serving children with ASD. Research is needed to define intervention ingredients that are feasible for educators to implement, thereby enhancing adoptability.

The literature provides some insight into barriers to implementation of evidence-based interventions in public school classrooms. One major barrier pertains to lack of adequate training to prepare educators to effectively instruct children with ASD (Scheuermann et al., 2003; Loiacono and Allen, 2008; Busby et al., 2012; Eapen et al., 2013). In addition, many educators express skepticism about the feasibility of implementing evidence-based practices in the “real world” (Stahmer et al., 2005). Many ASD early interventions are delivered on a 1:1 basis or involve play-based contexts (e.g., Kasari et al., 2006; Boyd et al., 2010; Dawson et al., 2010), which are not always valued in education settings (Dykstra Steinbrenner et al., 2015). Furthermore, administrators whose role it is to support classroom-based educators often report a lack of knowledge, training, and experience in ASD (Segall and Campbell, 2012) and special education (Billingsley, 2004). The resulting research-to-practice knowledge gap prevents the majority of young students with ASD from receiving evidence-based intervention, compromising student outcomes (Schwartz and Sandall, 2010).

Given the rising number of students with ASD, school systems are in dire need of evidence-based, cost-effective, and efficient educational service delivery models that address the intensive, specialized learning needs of children with ASD, as well as the practical needs of educators. Two priorities must be addressed: (1) empirically researched interventions must be translated for feasible implementation by community practitioners; and (2) such efforts must identify *and* propose solutions to the specific barriers to implementation of evidence-based ASD interventions in community settings to promote transportability and sustainability of implementation (Proctor et al., 2011). Our group is conducting a community-based study focusing on these priorities within public school classrooms serving preschoolers with ASD; this paper focuses on the second priority. Here, we report results obtained during a qualitative examination of the perceived acceptability of the Early Achievements (EA) intervention (Landa et al., 2011) by teachers, teaching assistants, and special education administrators (collectively, stakeholders) during the 2-year iterative process of translating the intervention for implementation by teachers. The aims addressed in this paper are to: (1) report on implementation barriers gleaned from meetings with stakeholders; (2) examine differences in perceptions between the two stakeholder groups; and (3) discuss feasible, effective solutions to key barriers based on their use by the study team in participating classrooms.

## MATERIALS AND METHODS

The current study is part of a larger, ongoing study funded by an Institute of Education Sciences Goal 2 (Development)



grant. As defined by the funding agency, years 1 and 2 served as the iterative development phase. The larger study is collecting both quantitative (i.e., student/educator outcomes) and qualitative (i.e., feedback to guide iterative development) data. The qualitative data presented herein were obtained during the iterative development phase. The data are not available in a repository, but can be accessed for research purposes through communication with the authors.

Throughout the iterative development phase, the EA intervention was translated and revised for implementation in public preschool settings, and the professional development program was developed and revised. Simultaneously, educators received training and job-embedded coaching from study team members to support high fidelity intervention implementation. At regular intervals during this 2-year period, educators’ and administrators’ feedback was sought about barriers to implementation of the intervention and areas in which the professional development program could be improved. Based on stakeholder feedback, solutions were defined and implemented to address barriers. This iterative process is shown in **Figure 1**.

## Intervention and Training Programs

The EA intervention was originally developed and evaluated for efficacy in a clinical setting at an autism center in the United States (see Landa et al., 2011 for details about the intervention). The intervention primarily targeted core social and communication deficits of ASD in group and 1:1 contexts within a nursery classroom setting during strategically engineered instructional contexts with peers, with the intention of preparing children for school-based preschool settings. Naturalistic developmental behavioral intervention (NDBI) strategies were employed (Schreibman et al., 2015). Theme-based instruction and strategic selection of instructional materials were used to promote concept development, with language targets

**TABLE 1 |** Stakeholder information.

Stakeholder group	Study participation	Feedback obtained
Administrators • One local-level special education administrator • Two ASD resource specialists (provide classroom consultation across the county)	<ul style="list-style-type: none"> <li>Attended trainings; did not implement intervention</li> <li>Supported educational service delivery for students with ASD through programming and classroom consultation unrelated to the EA intervention</li> </ul>	Reviewed professional development materials; assessed adequacy of revisions; provided suggestions for further revision, and development of both the EA intervention and the training/coaching models
Educators (teachers and instructional assistants)	<ul style="list-style-type: none"> <li>Active participants in study trainings, coaching, EA implementation, and data collection</li> <li>Interacted with students and families</li> </ul>	Provided ongoing, structured feedback on all elements of EA intervention and training programs, as well as other study elements (e.g., data collection, communication)

mapped to concepts being taught. An activities-based learning approach was taken to promote children's self-generated social interaction and communication. In its translated form, the EA intervention was intended to complement and augment educators' existing classroom approaches, curricula, materials, and philosophies, yet provide educators with the expertise to boost learning in core deficit areas of social and communication functioning in preschoolers with ASD.

As part of the current study, educators were trained in the EA intervention components described above (Landa et al., 2011) during 6 day-long workshops led by study team staff across each year. Educators were trained to implement the intervention within two group contexts (interactive book sharing, snack) and one 1:1 context (play). They were trained to infuse their classrooms with theme-based pictures and objects, select and adapt developmentally appropriate theme-related books for use during interactive book sharing, implement NDBI - strategies across contexts, and apply the EA supplemental social-communication curriculum.

Workshops included didactic and hands-on practice components. Weekly job-embedded coaching was provided by study staff for 7 months. Educators were provided with forms to self-monitor their fidelity of implementation for each EA component between coaching visits. Job-embedded coaching consisted of observing and giving live support in elements of EA implementation, followed by collaborative reflection, fidelity-related feedback by the coach after class, and action planning to define the specific strategies to refine before the next coaching visit, with steps to refinement co-defined by educators and their coach.

## Participants

The study took place in the 25th largest school system in the United States, serving a racially (58% non-Caucasian) and socioeconomically (47% eligible for free/reduced price meals) diverse student body. Four schools participated in

**TABLE 2 |** Demographic information.

Stakeholder group	Highest degree	Years experience with ASD
Administrators ( $n = 3$ )	Master's degree ( $n = 3$ )	Mean: 15 (range: 13–17)
Teachers ( $n = 4$ )	Bachelor's ( $n = 3$ ); Master's ( $n = 1$ )	Mean: 14 (range: 5.5–30)
Instructional assistants ( $n = 4$ )	Associate's ( $n = 2$ ); Bachelor's ( $n = 2$ )	Mean: 7.5 (range: 4.5–13)

the study reported herein, with one classroom participating per school. The average class size across the participating classrooms was six students (range: 3–9 students) with 66% of classrooms serving only students with ASD. In the remaining participating classrooms, the majority of students were served under the classification of ASD and additional students had other developmental disabilities or were typically developing. Staffing of all participating classrooms consisted of one lead teacher, one instructional assistant, and one to two additional adult assistants.

Qualitative data reported here were gleaned from two groups of stakeholders: (1) administrators recruited due to their pivotal role in local public school programming for preschoolers with ASD ( $n = 3$ ); and (2) special education teachers and instructional assistants participating in the study across four schools ( $n = 8$ ). All three administrators invited to participate accepted the invitation. Participating administrators' professional roles were related to ASD and special education services across the county and were not school-specific, as would have been the case with principals, for example. This allowed for broader feedback on the administrative level. Educators participated in teams of one teacher and one instructional assistant. The additional adult assistants for each classroom did not participate in trainings due to logistical constraints (e.g., outside employment, additional responsibilities outside of classroom). Participation was voluntary and all stakeholders provided informed consent through a process approved by the Institutional Review Board of the center's affiliated university. See **Tables 1, 2** for information about participating stakeholders.

## Procedures and Analysis

All feedback meetings with the stakeholders took place at the study center. A total of five administrator feedback meetings and 12 educator feedback meetings were held at approximately equal intervals during the academic year across the two iterative development years. All meetings were video and/or audio taped for transcription and coding. Administrator verbal feedback meetings followed a semi-structured agenda of topics and were 1–2 h in duration. Topics included compatibility of the EA intervention with state-mandated curricula, logistical considerations for educator training, accessibility and revision of training content and coaching support, and general discussion of barriers to EA implementation. Verbal feedback from educators was collected during trainings, with focus on the same areas outlined above. Written feedback was also collected from all stakeholders at the end of each training using open-ended questions such as "Please tell us what was most and least

effective from each of the topic areas covered today,” and “What component of the intervention do you think will be the easiest/hardest to implement?”

To address the first aim of the study, transcribed feedback was analyzed by two study team staff trained in qualitative coding methods, with coders identifying themes related to barriers to implementation of the EA intervention in the public school setting. Each coder independently coded the same transcripts ( $n = 17$ ) and written feedback forms ( $n = 70$ ), identifying recurrent themes using a grounded theory-based approach (Strauss and Corbin, 1990). This methodology has been used effectively across the fields of developmental disabilities and special education (Midence and O’Neill, 1999; Ostmeyer and Scarpa, 2012). The first step in the coding process was open coding, during which the coders evaluated transcripts and feedback forms line by line to identify initial barriers noted by stakeholders. Criteria for identification as a “barrier” included: (1) being mentioned more than one time and (2) being mentioned by more than one stakeholder. These criteria were established to achieve our goals of identifying themes representative of the stakeholder groups rather than identifying isolated perspectives, and to enhance transferability of results. Following open coding, axial coding took place, during which coders grouped similar barriers together to create overarching categories and define subcategories based on specific examples provided by stakeholders. To address the second aim of the study, the study team then compared the final barriers across the two stakeholder groups.

In order to increase the rigor of the qualitative analysis methods used, the two independent coders compared codes to come to consensus. Following the consensus process, coders identified barriers on which they agreed and only those barriers are included in the results presented here. Barriers identified by only one coder were either removed or included under an existing barrier. Finally, wording of barriers was refined by the research team according to consensual qualitative research methods (see Hill, 2012) to best exemplify the data.

To address the third aim of the study, the study team reviewed coaching logs and meeting minutes from years 1 and 2 of the study to determine solutions that had been effectively used to address key barriers across participating classrooms. Criteria for qualifying as a *key* barrier included: (1) endorsement by both stakeholder groups, and (2) potential amenability to change within the intervention development period of the grant. Effectiveness was determined through anecdotal reports that included coach observations of changes in educator behavior, as well as participating stakeholders’ reports of success.

## RESULTS

Barriers determined through qualitative analysis of stakeholder feedback are presented first, with proposed solutions to key barriers presented next, along with anecdotal accounts of the impact of the solutions implemented by the study team.

## Barriers

Qualitative analysis of transcripts and feedback forms revealed a number of overarching barrier categories. To increase the depth and definition to the overarching categories, more fine-grained examples of identified barriers are provided as subcategories, or types. All barriers are presented in **Table 3**, with the right column indicating which stakeholder group endorsed each barrier type. As determined by study team consensus, based on literature review and experience, barriers that are specific to educators’ implementation of the EA intervention during this study are marked with a superscript of “1” and barriers reflecting larger system constraints affecting implementation of any evidence-based intervention are marked with a superscript of “2.” Notably, the majority of the barriers endorsed by participating stakeholders reflected system constraints as opposed to intervention-specific constraints.

The six identified overarching barrier categories were classified as Educator Preparedness, Educator Engagement, and Educational Team Cohesion, difficulties inherent in Instructing Students with ASD, factors associated with limitations in educational Time and Resources, and Administrative-Related Decisions and Support. Both stakeholder groups (administrators and educators) endorsed each of these categories.

The category with the most barrier types ( $n = 6$ ) was Educator Preparedness. The types of barriers identified within this category largely pertained to factors cascading from insufficient pre-service and in-service training to implement evidence-based instructional strategies with students with ASD. Educators specifically identified feeling insufficiently prepared to: (a) implement Pivotal Response Training (Koegel et al., 1989) strategies, (b) establish developmentally appropriate goals for children, and (c) implement instruction through play-based activities in 1:1 contexts. The other five barrier categories included two to three specific barrier types within each, as outlined in **Table 3**.

## Agreement Between Groups

Agreement between educators and administrators about barriers to implementation is outlined in **Table 3**, with an X in each group’s column representing an agreement and an X in only one group’s column representing a disagreement. While there was substantial agreement between educators and administrators regarding the overarching barrier categories, there was variation in their endorsement of the types of barriers within the categories, with 75% agreement on barrier types within the categories. The greatest discrepancy (33% agreement) between educators’ and administrators’ perceived barrier types was identified within the category of Time and Resources. Within this category, administrators endorsed only one of the three specific barrier types cited by the educators (i.e., insufficient time). In other categories, where overall agreement between educators and administrators was stronger, a few other discrepancies in perceived barriers were noted across the educator and administrator groups. Only the educators perceived the method of evaluating their performance (e.g., EA fidelity assessment vs. school-based evaluation of educator’s performance) to be a barrier to adoption of evidence-based instructional strategies.



**TABLE 3 |** Barriers identified by stakeholders.

Overarching barrier categories (bolded) Types of barriers identified within categories (not bolded)	Stakeholder Group	
	ADM	EDU
<b>EDUCATOR PREPAREDNESS</b>		
Insufficient professional and educational preparation (work experience/training) <sup>b</sup>	X	X
Material presented in the initial EA training period was highly novel and unfamiliar <sup>a</sup>		X
Hesitation to be observed and coached <sup>b</sup>	X	X
Not including support staff (e.g., paid parent helpers) in the formal EA intervention training meetings (only teachers and assistants were trained) <sup>a</sup>	X	X
Difficulty balancing implementation of behavior management and the EA intervention strategies in classrooms with children experiencing severe behavior challenges <sup>b</sup>	X	X
Difficulty incorporating effective data collection <sup>b</sup>	X	X
<b>EDUCATOR ENGAGEMENT</b>		
Challenges with “working off the clock” (assistants not permitted to work outside of school hours) or during breaks, limiting planning, and meetings related to EA training or educational planning in general <sup>b</sup>	X	X
Discontinuity between personnel evaluation systems related to EA implementation and primary instructional responsibilities <sup>a</sup>	X	
Resistance to changing previous instructional methods <sup>b</sup>	X	X
<b>EDUCATIONAL TEAM COHESION</b>		
Variability or transience of support staff in the classroom, reducing teachers’ ability to implement the EA intervention as intended with consistency and effectively <sup>b</sup>	X	X
Factors contributing to the lead teachers’ ability to effectively train and manage support staff in implementation of the EA intervention <sup>b</sup>	X	X
Logistical constraints to collaboration between educators and other providers (SLP, OT, etc.) resulting in discontinuity of intervention implementation <sup>b</sup>	X	X
<b>INSTRUCTING STUDENTS WITH ASD</b>		
ASD students’ core deficits involving low levels of engagement made instruction difficult in general <sup>b</sup>		X
ASD students’ low tolerance for instruction and intervention based on atypical interests and insistence on sameness <sup>b</sup>	X	X
<b>TIME AND RESOURCES</b>		
Large classes (growing throughout school year) with high student-to-staff ratios made EA implementation difficult <sup>b</sup>		X
Need for appropriate/operational toys and materials, and insufficient funds to purchase needed intervention materials/equipment <sup>b</sup>		X
Insufficient time to plan, create materials, access resources, and implement EA intervention in its entirety <sup>b</sup>	X	X
<b>ADMINISTRATIVE-RELATED DECISIONS AND SUPPORT</b>		
Insufficient background in, and understanding of, special education, and ASD, as needed to support classroom teams <sup>b</sup>	X	X
Need for supervisor training in the EA intervention to provide ongoing support when needed to maintain high levels of educator fidelity <sup>a</sup>	X	X
Need for further alignment of the EA intervention with mandated curriculum and IEP goals, and for administrators to provide latitude for educators to adapt existing curriculum to meet the needs of students with ASD <sup>a</sup>	X	X

Stakeholder Key: ADM, Administrators; EDU, Educators.

<sup>a</sup>Barrier specific to implementation of EA intervention.

<sup>b</sup>Barrier related to larger-scale educational system constraints.

In addition, administrators, unlike educators, did not cite the novelty of the EA training material, low engagement of students with ASD in education-related activities in general, large class size, or need for appropriate/operational materials and equipment as barriers to implementation of the EA intervention.

## Solutions to Key Barriers

After receiving the stakeholders’ feedback and examining their insights into the barriers impeding optimal implementation of the EA intervention with their preschool-aged students with ASD, the study team devised solutions to key barriers as part of the iterative development process. The changes and products generated by the study team, with input from the stakeholders,

to address the identified barriers (see **Table 3**) resolved most of the EA-related perceived barriers reported by educators and administrators in years 1 and 2 of the study. Some factors related to school system policies and procedures were beyond the study team’s power to address (e.g., class size, supports to manage severe challenging behavior, scheduling complexities thwarting ability to team with allied health professionals). However, there was a substantial positive impact of the strategically revised, and simplified, intervention implementation requirements and associated revised professional development workshops, resulting in educators’ expressed intention to adhere to the EA intervention protocol during the project, and thereafter. See **Table 4** for a summary of key barriers,

**TABLE 4 |** Key barriers, solutions, and overall impact.

Key Barriers	Solutions	Overall impact
Educator preparedness	<ul style="list-style-type: none"> <li>• Structured supports (e.g., step-by-step instructions and protocols) provided to educators to better guide EA implementation</li> <li>• Classroom visual aids (e.g., laminated posters) outlining key behavioral strategies provided to educators to increase instructional effectiveness</li> <li>• Fidelity of EA implementation forms and associated coaching strategies streamlined and simplified</li> </ul>	<ul style="list-style-type: none"> <li>• Study team staff noted improvement in quality of educators' intervention implementation; study staff needed to provide less specific guidance in intervention implementation; fidelity of EA implementation improved</li> <li>• Study team staff noted increased engagement in students as educators implemented the EA elements with greater consistency</li> <li>• Study team staff and educators observed immediate increase in educators' use of behavioral strategies</li> <li>• Educators reported appreciation, as well as increased confidence, and comfort with materials and support</li> </ul>
Time and Resources	<ul style="list-style-type: none"> <li>• Team planning time incorporated into EA training workshops to enhance educators' preparedness, cohesion, and confidence</li> <li>• Connected educators with existing county-provided resources such as printing, laminating, and material creation</li> <li>• Created a user-friendly resource-sharing website established for participating educators to use for planning and sharing across teams</li> <li>• Intervention elements simplified, while retaining key EA components, to reduce time, and resources needed for educators' implementation of EA</li> </ul>	<ul style="list-style-type: none"> <li>• Educators reported greater confidence as a result of the simplified trainings and increased planning time</li> <li>• Study team staff noted an increase in educators' fidelity of EA implementation</li> <li>• Educators reported a slight increase in utilization of available county-provided resources for material creation</li> <li>• Educators reported appreciation of the value of the EA materials they created/archived, as well as the subsequent reduction in planning time in future years</li> </ul>
Administrators	<ul style="list-style-type: none"> <li>• Administrators invited to training workshops</li> <li>• Document created aligning EA strategies with curricula and Common Core State Standards</li> </ul>	<ul style="list-style-type: none"> <li>• Administrators reported increased awareness of barriers to implementation of EA</li> <li>• Administrators reported increased understanding of EA strategies being used in classrooms they supported, allowing them to provide more focused support</li> <li>• Study team staff noted greater team cohesion due to executive committee members' advocacy for teachers to retain consistent support staff</li> <li>• Educators reported greater satisfaction with and ability to implement EA due to administrative permission to adapt curricula to integrate EA and meet students' needs</li> </ul>

solutions, and impact of the study team's solutions as anecdotally determined through stakeholder report and study team observations (e.g., fidelity of implementation ratings).

### Educator Preparedness and Engagement

The study team took multiple specific steps to address the barrier of educators' gaps in pre-service and in-service preparation. At study launch, the compensation for gaps in educator training was addressed by designing a thorough professional development program involving six workshops and job-embedded coaching. Feedback from educators indicated that the EA instructional strategies were novel and, therefore, felt distal from their current approach to instruction. Most specifically, they had not been trained to specifically target developmental learning goals focused on language, cognition, or social development. This hampered their ability to implement PRT strategies (e.g., giving clear and appropriate antecedent cues, knowing when and how to reinforce a child's "response" or initiation, knowing when and how to prompt child responses). Rather, they were accustomed to implementing educational curricula that focused more heavily on education concepts such as numbers, letters, shapes, colors, calendar, and so forth using general educational activities within Circle and Center-based activities.

The identified solutions maximized the compatibility of the intervention with the values and practices of the end users (educators) to improve acceptability and feasibility for sustained

implementation (Proctor et al., 2011). This was accomplished via changes that simplified the EA intervention design and, accordingly, professional development program.

First, we limited the EA implementation contexts to those already being used (book sharing, snack, art). This meant eliminating the 1:1 play context in which we had originally asked educators to implement the intervention. Second, explicit instruction about implementation of NDBI strategies was minimized in the professional development program, replaced by supports that structured the intervention delivery in such a way that the strategies would automatically be implemented. For example, a semi-structured format for interactive book sharing, art and snack implementation was designed. The core format defined how to embed each of the EA intervention targeted goal domains (i.e., joint attention, reciprocal peer engagement, social imitation, language, and play) into an interactive book sharing activity. One feature of the book sharing format involved distributing a certain number of opportunities for each goal domain across the book pages via an "activities per page" venue, making stories come alive for the children by engaging their active participation without using a "question and answer" format. Later in the training process, educators learned how to extend these same goals and instructional strategies to snack/meal and art/craft routines. Another feature of the semi-structured format defined principles for placement of pictures and objects to "bait" children's social and communicative

initiation and to provide natural opportunities for educators to deliver joint attention bids to which children would respond. Third, we devised a system of goal domain-specific least-to-most prompt hierarchies for use across the book sharing, snack, and art instructional activities. Educators practiced and perfected their use of these prompt hierarchies, or “presses,” in repeated role play activities during the professional development workshops before classroom implementation.

Fourth, increased support for educators’ consistent implementation of the EA intervention instructional strategies was achieved by simplifying the content (in number of items, objectivity/concreteness of the targeted strategies, and language) of the fidelity of implementation form. Furthermore, coaching support was reformatted to focus on fewer (maximum of three) components of the EA intervention at a time. Following the above revisions, educators reported a shift from feeling overwhelmed by trying to learn many instructional strategies to enjoying knowing how to elicit engagement from otherwise passive or disengaged students as they implemented the new iteration of the EA intervention. Educators learned the choreography of the interactive activities per page during book sharing. Effective use of the prompt hierarchies replaced their prior practices of either not following through with an instructional opportunity or using the maximal prompt level when children failed to respond to an instructional opportunity. They began to use the fidelity form as a checklist reminder to incorporate the key EA intervention elements during their instruction. High fidelity of implementation was achieved by participating educators, which will be described in a forthcoming report.

### Time and Resources

All stakeholders reported as a barrier limited time to plan, create materials, access resources, and implement the EA intervention in its entirety. To address this barrier, the study team: (1) incorporated planning time into training workshops; (2) connected educators with existing county-provided resources such as printing, laminating, and materials creation; (3) established a user-friendly resource-sharing website for participating educators; and (4) simplified the intervention elements and instituted the semi-structured implementation formats described above, minimizing planning demands while retaining key components. Except for availability of county-provided resources, participating educators reported that these changes empowered them with greater confidence in their implementation of the EA intervention. There was minimal utilization of available county-provided resources for material creation due to educators’ self-reported need to plan lessons/themes immediately before implementation. Importantly, educators reported feeling more invested in devoting time to planning for EA implementation because they knew exactly what and how to plan materials and activities that substantially increased engagement and developmental progress in their students at a level they had not thought possible. Furthermore, they reported the perceived value of investing in establishing materials to be archived in theme-based instructional packets that would be used henceforth, reducing planning time in the years to come.

### Administrators and Educational Team Cohesion

All stakeholders noted school-based administrators’ gaps in background in, and understanding of, ASD-related learning needs and evidence-based instructional strategies as a barrier to implementation of new interventions, including the EA intervention. In an effort to begin the process of change in this area, the study team invited administrators to attend training workshops along with educators. Although the county’s autism coordinator and two autism support staff attended the training meetings, participating schools’ principals and assistant principals were not able to do so. Through engagement in study trainings and feedback sessions, participating administrators became keenly aware of the barriers to implementation of the EA intervention based on participation in discussions with educators. They also reported becoming aware of the EA strategies to be used in the classrooms they supported, empowering them to provide support after the study and to be better-informed advocates for educators of students with ASD. Concrete results of this solution included these administrators’ increased efforts to maintain consistency of support staff in participating classrooms to minimize time and resources that teachers have to allocate to retraining new personnel and to maximize instructional team cohesion (another identified barrier). Such staffing consistency would improve continuity of high-fidelity instruction for students with ASD.

Stakeholders also identified the need for more clearly defined alignment between the EA intervention and the state-mandated curricula. Stakeholders reported the need for non-participating administrators to grant them permission to adapt existing curricula to achieve more effective instruction, such as they perceived they could achieve through the IA intervention. To address this barrier, the study team aligned each EA strategy and set of child learning goals with the current state mandated curriculum and the Common Core State Standards. This resulting alignment document yielded new insights and understanding for educators and administrators about how to address core learning impairments of children with ASD by supplementing existing curricula with the EA intervention, and the importance of doing so. Indeed, both groups reported that the alignment document clarified how well the EA intervention-specified child development goals satisfied and facilitated their ability to readily address children’s IEP goals. By the end of study year two, no barriers were identified regarding the fit of the EA intervention with existing curricula.

## DISCUSSION

In the past decade, there has been an increased focus on translating evidence-based ASD interventions for community settings. Despite these efforts, there has been minimal successful adoption of these interventions in the community. In addition, the ASD intervention literature has not simultaneously examined educators’ and administrators’ perceived barriers to implementation, as we do here. We sought feedback directly from community stakeholders about barriers to successful EA intervention adoption in public preschool settings and three

key findings emerged: (1) key barriers to implementation were consistent with those from the general and special education (non-ASD) literature; (2) discrepancies between educators and educational administrators in perceived barriers to implementation were evident; and (3) solutions to barriers were identifiable and involved processes of intervention simplification and embedding of intervention ingredients within familiar and accessible instructional practices. Parallel simplifications and supports also were required in the professional development program to ensure transfer from training to classroom and administrator support.

The overarching barriers to implementation of the EA intervention surrounded mostly large-scale educational system constraints and included issues of educator preparedness, engagement, and team cohesion, difficulties inherent in instructing students with ASD, and limited educational planning time, resources, and administrator support. These barriers were identified through direct sampling of stakeholders' perspectives, adding an important end-user dimension to the literature on barriers to adoption of evidence-based interventions into public school classrooms that is largely presented through the lens of researchers (e.g., Locke et al., 2015). Existing literature in the areas of general education, special education, and educational leadership validates each of these barriers, with particular attention to educator preparation (e.g., Brownell et al., 2010), burnout (e.g., Fernet et al., 2012), and engagement (e.g., Azad et al., 2015). Additional attention has been drawn previously to the time and resource constraints experienced by special education teams (e.g., Ostmeyer and Scarpa, 2012; Locke et al., 2015), the interdependence of educator motivation and administrator support (e.g., Thoonen et al., 2011; Locke et al., 2015), and philosophical barriers that reduce team cohesion (e.g., Nellis, 2012). When experienced by educational teams serving the complex population of students with ASD, these barriers appear to be compounded.

As supported by the finding that larger scale educational system constraints outweighed intervention-specific barriers, it seems that longstanding and well-established education policy, training, and procedural factors thwart successful adoption of evidence-based instructional practices by public school educators of students with special needs. Examination of these factors could benefit other researchers who are developing interventions for implementation in public school settings, and could inform teacher educators who are in the position to address gaps in teacher and administrator preparedness. The solutions described herein substantially eliminated the previously identified barriers and extend innovative concepts presented by Dykstra Steinbrenner et al. (2015) relevant to the intervention development process, including incorporating opportunities to secure input from implementers, emphasizing the value of their feedback within the research process, and highlighting changes made to the intervention based on their feedback. The methods and successful solutions outlined here may inform teacher educators' pre- and in-service curriculum planning, while also supporting intervention researchers in translating evidence-based interventions for implementation in public education contexts. This, in turn, may reduce pitfalls that contribute

to the research-to-practice gap in special education and ASD early intervention.

## IMPLICATIONS

Examination of the discrepancies in perceptions between the two stakeholder groups revealed implications for practice and policy. Barriers endorsed by educators but not by administrators were largely based on the everyday classroom experience of educators. For example, educators were keenly aware of the impact of large class sizes, inadequate resources to obtain developmentally appropriate toys and books, and the difficulties inherent in instructing students with ASD, particularly when one or more children in their class had severe behavioral challenges. Interestingly, they also reported their own difficulty absorbing the EA training content, a self-reflection that relates to other barriers noted, including gaps in professional preparation. The only barrier endorsed by administrators but not by educators was related to educators' occasional reluctance to adopt new instructional strategies, akin to, but falling short of, the resistance to adoption of new interventions reported in the literature (Cook and Schirmer, 2003; Odom, 2009; Maggin et al., 2010). Interestingly, the educators attributed their difficulties more to external factors than to their own motivation and buy-in.

Solutions implemented by our study team reduced most key barriers by simplifying and providing structured implementation supports. The impact of the solutions is described above; however, effective instruction in general for students with ASD may benefit from more systemic changes in policies, resource allocation, teacher, and administrator preparation, and procedural implementation (e.g., of school system-selected curricula) as they pertain to education of young children with ASD. For example, revision is needed in pre-service training programs for early childhood special educators, with enhanced training in areas such as positive behavior support. An additional implication for practice and policy is the need for targeted educator training paired with job-embedded coaching. Ideally, a professional development "ladder" would be defined whereby training, over the course of years, systematically builds upon established instructional skill. Such a ladder, with associated competency assessments at each level, would permit administrators to empirically define educators' readiness for more advanced training, optimize pairing of educators and instructional support staff, amount of supervision and coaching needed, and so forth. Ultimately, as more educators receive such pre-service training in evidence-based instructional practices for children with ASD, and as some become administrators and supervisors, high fidelity implementation of evidence-based practices will become more and more evident in classroom settings.

In the meantime, steps toward more comprehensive implementation of evidence-based educational practices for children with ASD may include focused efforts to inform administrators (school and county levels) of the learning needs and characteristics of students with ASD. Multiple recent studies have highlighted school administrators' self-reported need for



training and education in best practices for ASD classrooms, especially preschool classrooms (Pazey et al., 2014), in order to effectively support educators within these classrooms. Based on existing research and this study's findings, it is clear that efforts in intervention development, community implementation, and educator training must place greater emphasis on the pivotal role of administrators. Future efforts should strive to include school and county level administrators in consideration of new intervention strategies, training, and implementation from the earliest phases.

## Limitations

There are several limitations to the current study. First, there is an inherent subjectivity to qualitative analyses. To address this limitation, the study team made efforts to maximize objectivity of the analyses through double coding of the data and use of consensus procedures. Calculation of traditional inter-rater reliability is employed by many qualitative researchers; however, it is discouraged by some prominent scholars in the field of qualitative inquiry (e.g., Braun and Clarke, 2013). A second limitation is the anecdotal nature of the report on the impact of solutions to address key barriers identified in this study. This study presents preliminary qualitative data regarding the impact of the solutions in order to illustrate the associated potential for increased intervention uptake and implementation success in community settings. Finally, as with any small-scale study, transferability of findings is limited due to sample size and regional differences. The relatively small number of stakeholders enrolled in the study can be attributed to funding constraints and the intense participation requirements that exceeded stakeholders' regular duties, including multiple day-long trainings, regular coaching meetings, and ongoing communication with the study team. The in-depth feedback acquired during the study was only attainable from administrators and educators who were completely immersed in the training/coaching program.

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Despite the limitations, findings from this study add to existing literature by highlighting educator- and administrator-perceived barriers to implementation of an evidence-based intervention for young students with ASD, and especially by proposing feasible solutions and identifying clear implications for teacher education and related policies and practices.

## AUTHOR CONTRIBUTIONS

RL: conception of the study and critical revision of the article; KW: data analysis and interpretation and drafting the article; RL and KW: data collection and final approval of the version to be submitted.

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