



Fostering Informed and Responsive Systems for Trauma in Early Care and Education (FIRST:ECE): A Preliminary Evaluation

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Abstract

Children with histories of trauma exposure experience a wide-range of developmental, social, emotional, and behavioral symptoms. The effects of traumatic life experiences can impact children’s ability to learn and function within the school environment. Trauma-informed (TI) schools seek to create environments in which children with experiences of trauma can build resilience and be successful and must begin as early as possible in the child’s educational experience. The current paper summarizes preliminary evaluation results from a two-year initiative focused on implementing TI organizational change in two school district pre-kindergarten (pre-k) systems in a Southern state. Site 1 (urban) had 7 pre-k locations with 31 classrooms, while site 2 (micropolitan) had 5 locations with 12 classrooms (43 classrooms total). In surveys across two years, participating teachers (N=91) reported gains in trauma-related knowledge and implementation of TI teaching strategies. Surveys of a subset of staff who were involved in district-level teams focused on implementation of broader TI organizational changes (e.g. adapting policies and procedures) revealed that most staff felt they developed an effective and sustainable process for facilitating organizational change. Theoretical implications and future directions are discussed.

Keywords Trauma-informed care · Preschool · Social-emotional · Program evaluation · Teacher training

Introduction

Trauma in Early Childhood

Prevalence

According to the Substance Abuse and Mental Health Services Administration (2014), trauma results from an event (or events) or circumstance that is experienced as physically or emotionally harmful or life threatening and that results in lasting effects on functioning or well-being (mental, physical, social, emotional, or spiritual). Based on the National Survey of Children’s Exposure to Violence and a nationally representative sample, 80% of children ages 2–17 experienced at least one type of trauma, and two-thirds (66%) experience more than one type of trauma (Turner et al., 2010). Approximately 1 in 4 children will experience maltreatment before reaching age 18, while an estimated 1 in 7 children will experience abuse or neglect in any given year (Centers for Disease Control and Prevention, 2020). Nationally, the youngest children are most likely to experience maltreatment. For example, in 2020, children birth to 12 months of age had the highest victimization rate at 25.1

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per 1,000 children (U.S. Department of Health and Human Services, 2022). Compared to older children, young children are also more likely to be exposed to domestic violence in their homes (Fantuzzo & Fusco, 2007). Among the most common types of maltreatment reports are neglect, physical abuse, sexual abuse, lack of supervision and parental exposure to drug addiction (U.S. Department of Health and Human Services, 2022).

Children in Arkansas, the setting for this study, are exposed to potentially traumatic experiences at higher rates than the national average. For example, estimates suggest that 3.3% of Arkansas children live with a parent who has a substance abuse problem, 9.4% with a parent with a mental health problem and 14.5% have lost a parent to incarceration (Child and Adolescent Health Measurement Initiative, 2020). Consistent with national data, young children in Arkansas are especially likely to experience maltreatment, with half (49%) of substantiated child abuse or neglect occurring among children under the age of 6 (Arkansas Department of Human Services Division of Children and Family, 2021).

Impact of Trauma

Research is clear that even though young children may not remember what happened, they can nonetheless experience significant negative impacts of trauma exposure (National Scientific Council on the Developing Child, 2010). They may experience wide-ranging impacts such as delays in executive function, developmental delays, or loss of developmental milestones or skills they had previously achieved (Pears & Fisher, 2005). They may experience mental health problems such as posttraumatic stress disorder (PTSD), anxiety, and depression (Mongillo et al., 2009; Scheeringa et al., 2003) and may have challenges regulating emotions or managing behavior (Mongillo et al., 2009). In spite of misperceptions that children are likely to outgrow these problems, research suggest that often these problems continue into middle childhood and adolescence (Cohen & Scheeringa, 2009; Enlow et al., 2012).

Implications for Early Care and Education/Schools

Early education and K-12 personnel spend a significant amount of time with children, and education personnel make up the largest group (21.0%) submitting child maltreatment reports (U.S. Department of Health and Human Services, 2020). Because experiences of trauma can have negative impacts on child development, mental health, and behavior, they can also undermine children's ability to succeed in

school and can create disruptions in the classroom environment (Bethell et al., 2014; Carlson et al., 2016; Leiter & Johnsen, 1997). Children with histories of trauma exposure often experience challenges in school, including poor attendance, less engagement with the school system, higher rates of special education involvement, lower grade point average and grade retention (Bethell et al., 2014; Burke et al., 2011; Leiter & Johnsen, 1997). These impacts begin early, with studies finding young children with adverse experiences at increased risk for problems in academic performance, attention problems, social skills problems and aggression at school (Jimenez et al., 2016). Additionally, studies find that these kinds of behavioral concerns impact early childhood education teachers' stress (Friedman-Krauss et al., 2014) and emotional exhaustion (Jeon et al., 2018), subsequently affecting teachers' capacity to work effectively with children and the quality of relationships teachers have with children (Whitaker et al., 2015).

Given the association between trauma and social/behavioral concerns, school policies can have the unintended consequence of re-traumatizing children through punitive or harsh responses, including exclusionary practices such as suspension or expulsion (Carlson et al., 2016). There is evidence that this process begins early in children's educational experiences. For example, in a recent evaluation of one state's early care and education (ECE) expulsion prevention system, more than 50% of the referrals for support were related to child that had experienced a traumatic event (Connors Edge et al., 2020). Similarly, Zeng and colleagues (Zeng et al., 2019) reported on data from 6,100 parents of preschool age children using data the 2016 National Survey of Children's Health and found that for each additional Adverse Childhood Experience reported, there was an incremental increase in odds of suspension or expulsion.

Trauma-Informed (TI) Approaches

Educators and other school personnel play a critical role in the lives of children and are well-positioned to identify children in need of support and respond with resilience-building strategies that will help children meet their potential and assist schools in meeting their goals. We use the term resilience to describe the ability of a child to adapt and recover after experiencing a traumatic event (National Child Traumatic Stress Network, 2016). According to the federally funded National Child Traumatic Stress Network, a trauma-informed (TI) school system is one in which all members of the school community are equipped to recognize and respond to the impact of trauma on students and others in the school system, understanding that trauma impacts emotions, behavior, and the ability to succeed academically

Table 1 FIRST:ECE approach to addressing 10 components of trauma-informed (TI) schools

10 Components	Description	Initial All-Staff Training/Booster	Teacher Training, Coaching, Peer Support	Support of Change Team
Identification and Assessment of Traumatic Stress	Identifying students with a history of trauma to support appropriate response			X
Prevention and Intervention for Traumatic Stress	Access to TI prevention and intervention resources /appropriate referrals for staff and students		X	X
Trauma Education and Awareness	Regular opportunities to participate in professional development to increase trauma knowledge	X	X	
Partnerships with Students and Families	Developing partnerships with students and families to create a TI school environment			X
Trauma-Informed Learning Environment	School-wide TI practices, including teaching and modeling of social and emotional skills in classrooms	X	X	X
Cultural Responsiveness	Recognizing differences and promoting culturally appropriate responses to trauma		X	X
Emergency Management/Crisis Response	Development of policies/ procedures related to prevention, response and recovery following crises		X	X
Staff Self-Care and Secondary Traumatic Stress	Promotion of staff well-being and recognition and prevention of secondary traumatic stress		X	X
School Discipline Policies and Practices	TI policies and practices that prioritize prevention and balance safety and skill-building for students		X	X
Cross System Collaboration and Community Partnerships	Collaboration among school personnel, families, and community or external organizations to ensure TI approaches in school			X

(National Child Traumatic Stress Network/Schools Committee, 2017). Key to the theory of change of a TI school is the idea that school personnel must create physically and emotionally safe environments that avoid retraumatization (the feeling of re-experiencing a trauma, sometimes triggered by circumstances that were similar to the earlier trauma). However, TI schools also go beyond the idea of ‘do no harm’ (e.g. avoiding retraumatization), and work to enhance child resilience. This includes building supportive relationship with children and teaching children skills to regulate their emotions and behavior so they can succeed in school (National Child Traumatic Stress Network/Schools Committee, 2017). Trauma-informed approaches benefit from an adoption of the “4 R’s”: (1) *realizing* the impact of trauma and the possibility of recovery; (2) *recognizing* signs and symptoms of trauma; (3) *responding* to knowledge of trauma exposure by creating system change; and (4) *resisting* retraumatization of students/staff/families (Substance Abuse and Mental Health Services Administration, 2014). TI approaches are thought to be most effective when they begin early in the child’s educational experience (e.g., ECE, pre-k) and continue throughout their experience with the K-12 school system (National Child Traumatic Stress Network/Schools Committee, 2017).

The NCTSN System Framework for Trauma-Informed Schools (National Child Traumatic Stress Network/Schools Committee, 2017) best-practice guidance from national experts in childhood trauma, identifies and describes the essential elements of a TI school that can help support school personnel in working with children who have experienced trauma. It includes 10 core areas of focus for educational system improvements and emphasizes a wide array of change that must be implemented school-wide, at an organizational level (see Table 1). While the NCTSN has provided a comprehensive framework to support system change initiative, unfortunately research on how to get there is limited. There is not yet a clear path, ‘guidebook’ or well-studied approach school teams can use to guide their efforts to achieving trauma-informed organizational change. Initiatives described in the scientific literature show promise, but are limited in that they tend to focus on only one or two components (most typically specific interventions for identified/referred children).

Measuring TI Change in Schools/Early Care and Education

In the research on TI schools/ECE, there has been particularly little focus on (1) initiatives to change the actual teaching practices of educational professionals and the ways in which they interact with students, (2) the role of non-teaching personnel in supporting students (e.g., bus drivers, cafeteria personnel, school counselors, school resource officers, administrators) and (3) how changes in policies/procedures impact students with experiences of trauma (Thomas et al., 2019). There is a strong and urgent need to design, implement, and evaluate broader system-change initiatives that, if successful, could be scaled.

It is critical for child- and family-serving sectors to establish an evidence base linking TI program activities with short-, intermediate-, and long-term outcomes (i.e., chains of evidence; Melz et al., 2019). Data on implementation is a key first step and can ensure the quality of TI programming and the achievement of long-term outcomes. Data on successive outcomes (knowledge gain, use of TI practices, implementation of TI policies and ultimately improvement of child outcomes) can demonstrate the value of TI approaches to stakeholders and funders. Measuring outcomes across multiple levels of the ECE system helps to evaluate the impact of change, establish a chain of evidence for trauma-informed programs, and demonstrate the value of investment into trauma-informed practices for relevant partners and stakeholders (Morrison et al., 2020).

Within the past several years, at least two groups have implemented TI interventions within ECE settings serving preschool populations. As an example, the Partnerships for Early Childhood Mental Health (ECMH) Program, supported by Project LAUNCH's parallel trauma-informed workforce development programs, developed an ECMH consultation model aimed to provide teachers with support to promote social-emotional development in their students as well as provide interventions within the classroom for children (Shamblin et al., 2016). Pre- and post-evaluation indicated increases in teacher competence and confidence regarding child behavior, decreases in negative behavior management strategies and negative attributions of child behavior in the classroom, and improvements in teachers' ratings of child resiliency (Shamblin et al., 2016). Another program, Head Start Trauma Start (HSTS) aimed to create a trauma-informed environment within preschool settings across three Head Start sites in the Midwest (Holmes et al., 2015). Additional goals of the HSTS program included decreasing the impact of traumatic stress and fostering and strengthening children's social and cognitive development through school-wide trainings, utilizing a referral process for trauma-focused mental health services, classroom

consultation, and a staff peer mentoring system to help promote sustainability of skills (Holmes et al., 2015). The HSTS program primarily utilized trauma-informed strategies and principles based in Attachment, Self-Regulation, and Competency (ARC) framework, and trained masters-level clinicians provided at home and school-based services using the ARC and Trauma-Focused Cognitive Behavioral Therapy (TF-CBT) treatment models (Holmes et al., 2015). Initial results of the HSTS program suggest positive changes in both teacher and parent report of externalizing child behaviors, parent-reported decreases in children's internalizing behaviors, and overall satisfaction of the HSTS program among school administration, teachers, and parents (Holmes et al., 2015). These findings are promising and provide some evidence-base regarding positive changes in child outcomes following implementation of trauma-informed practices within early childcare settings. Although the results of these programs are encouraging, outcomes primarily measured children's behaviors and additional studies are needed focusing on practice changes made by teachers within the programs.

Current Study

The purpose of this paper is to describe the development, implementation and preliminary evaluation of a TI change initiative called Fostering Informed and Responsive Systems for Trauma: Early Care and Education (FIRST:ECE). The purpose of study was to examine short-and intermediate outcomes to begin the process of building the 'chain of evidence' (Morrison et al., 2020) linking FIRST:ECE program activities to desired outcomes. Thus, our first purpose was to document the implementation process to determine the degree to which we were able to implement planned training, coaching, and organizational change facilitation activities in the context of two ECE programs. Next, our theory of change suggests that, beyond avoiding re-traumatization, much of the benefit of a TI school/ECE program derives from the actions of school personnel to build resilience by strengthening relationships with children and teaching them skills to regulate their emotions and behavior. Therefore, we explored key short and intermediate-term outcomes related to our project goals of increasing staff awareness about childhood trauma and teacher practice change. Is there evidence that staff/teachers perceived they gained necessary knowledge and skills and translated that knowledge into practice by engaging in these resiliency-building strategies more frequently?

Another premise of TI schools is that change is required at the organizational level as well as the individual staff level. As seen in Table 1, areas to explore include policies

Table 2 FIRST:ECE core goals and key implementation strategies

Goal 1: Raise awareness among all members of the school community about trauma and its impact on children to build resilience and avoid unintentional re-traumatization of young, trauma-exposed children.

Year 1 Training Strategy: 1.5 day training provided to all staff members in the school community year to raise awareness about trauma, its impact on children and families and basic concepts of trauma-informed care.

Year 2 Sustainability Strategy: Half-day booster training for staff/ support for planning to integrate training content into staff orientation.

Goals 2: Increase implementation of specific trauma-informed (TI) strategies for interacting with and teaching young children.

Year 1 Training & Coaching Strategy: A series of five teacher trainings paired with brief monthly coaching visits with each teacher to support them in their goals to implement specific TI classroom practices in the following areas: Supportive Relationships, Safety, Self-Regulation, Social Skills, and Self-Care.

Year 2 Sustainability Strategy: Facilitation of monthly site/building-level peer support meetings for teachers and identification of ECE staff to serve as site-level TI care ‘champions’ to support sustainability. In these problem-based learning meetings, teachers identified areas of challenge in their classrooms, and received support from FIRST:ECE trainers and their peers in identifying solutions based on prior TI learnings.

Goal 3: Support ECE agency ‘change teams’ to create TI system change (e.g., changes to policies, school environment, partnerships) through needs assessment, strategic planning, and resource development.

Year 1 Support Strategy: Provide facilitation and resource development for monthly ‘change team’ meetings of key ECE leadership and staff to support organizational change strategies.

Year 2 Sustainability Strategy: Continued facilitation of change team meetings, with the goal of building sustainable capacity for continuing under ECE internal leadership.

and procedures, identification of children and families needing more support, support for staff wellness and family and community partnerships. Here our evaluation focuses on the perception of the ‘change team’ members tasked with forming a team to focus on creating and sustaining TI organizational change. Specifically, we explore their perception that the change team process effectively engaged participants, produced system level changes that benefited the school system and equipped them to continue to make TI changes in an ongoing way.

FIRST:ECE Intervention

A multidisciplinary team from the University of Arkansas for Medical Sciences and Arkansas State University partnered to develop an approach to TI organizational change for ECE entitled “Fostering Informed and Responsive Systems for Trauma: Early Care and Education” (FIRST:ECE.). The overall approach was designed be consistent with recommendations from the National Child Traumatic Stress

Network (NCSTN) Framework for Trauma-Informed Schools (National Child Traumatic Stress Network/Schools Committee, 2017) which outlines a tiered approach to supporting trauma-exposed children and describes 10 essential components of a TI school (see Table 1).

FIRST:ECE is designed to (1) to address the resources, structure and needs of ECE settings, while still aligning with the recommended K-12 approach to ensure continuity across the learning environments; (2) provide a structured approach to making needed system changes in all 10 areas of NCTSN framework; (3) utilize best practices described in the ECE professional development literature as well as implementation science strategies to increase the likelihood of successful implementation including multi-session trainings, opportunities for practice, coaching and reflection (Melz et al., 2019; Powell et al., 2012; Spodek, 1996; Zaslow & Martinez-Beck, 2006); and (4) equip teachers and other school personnel with specific classroom practices to build social-emotional skills and support resiliency in all children, but particularly those with experiences of trauma.

FIRST:ECE uses a two-year, multipronged approach to address the core components outlined in the NCTSN TI Schools framework (see Table 1) and achieve our goal of improving social, emotional, and academic outcomes of young children exposed to trauma. As seen in Tables 1 and 2, we addressed the 10 NCTSN components through three main approaches: (1) Training to raise trauma awareness among all members of the school community, (2) Training, coaching and support for teachers related to implementation of specific trauma-informed (TI) strategies for interacting with and teaching young children in ways that are likely to build resilience, and (3) Support for ECE agency ‘change teams’ to create TI system change (e.g., changes to policies, school environment, partnerships). Change teams were comprised of volunteer representatives of staff designed to be inclusive of all levels of the organization (administration, lead teachers, paraprofessional, support staff) charged with identifying, designing and championing needed organizational changes. The FIRST:ECE staff team supported the change teams through needs assessment and strategic planning support, meeting facilitation, research on best practices and resource development. Training, coaching and change team facilitation activities were designed by a multidisciplinary team of psychologists, other mental health professionals and educators. Trainings were delivered by pairs of multidisciplinary team members, change teams were facilitated by psychologists and coaching visits were provided by educator team members trained as coaches to ECE professional.

Method

Participants

While FIRST:ECE has now been implemented in a range of programs serving infants, toddlers and preschoolers, it was initially implemented in two school district pre-kindergarten (pre-k) systems in Arkansas. It was developed and implemented with the support of quality improvement funds obtained by the two pre-k program administrators for the purpose of increasing supports to children with experiences of trauma. As such, these administrators essentially self-selected their sites into the project. Both programs were participants in the state's Quality Rating Improvement System with a level three rating (the highest level). One district was located in a urban area and one in a micropolitan area. Both districts had pre-kindergarten classrooms housed in multiple sites across the district. Site 1 (urban) had 7 physical pre-k locations housing 31 classrooms, while site 2 (micropolitan) had 5 physical locations housing 12 classrooms (43 classrooms total across sites). Classrooms were designed to serve 20 children, with a capacity across both sites for 860 children. In both sites, most classrooms were staffed by a teaching team comprised of a certified teacher (lead teacher) and an assistant teacher/paraprofessional (some sites had additional access to a 'floater' shared across all classrooms). Each district had a designated administrator who maintained overall responsibility for the pre-k program. In prior years, both programs had participated in training in Conscious Discipline®, a program designed to support the development of key social and emotional competencies within children (Bailey, 2014), providing a social-emotional foundation on which FIRST:ECE could build.

We gathered survey data from 91 staff members, including lead teachers (41.7%), assistant teachers/paraprofessionals (50.0%), administrators (4.2%) and other school staff (e.g. floaters, substitutes, bus drivers; 4.1%). We were able to obtain initial survey data from 96.5% of teaching staff, however the proportion of the total 'other' staff with missing data is unclear because several of the pre-k locations were housed in elementary school buildings, with an unknown number of other school staff who may at least partially support or interact with the pre-k programs (e.g. building administrators or bus drivers). In terms of years of experience serving as a teacher of children ages 0–5, 18.1% of teachers reported having 1–3 years of experience, 26.4% between 4 and 9 years and 55.6% had more than 10 years of experience. The sample was 100% female.

Data Collection and Analysis Plan

Project implementation data, including training, coaching, and team meeting data were collected on a monthly basis and summarized at the end of each program year to address questions related to fidelity of implementation. We summarized these using descriptive statistics. To address evaluation questions focused on teacher knowledge gain and change in frequency of use of TI strategies in the classroom, we conducted teacher surveys in years one and two of the project. Teacher perceived knowledge gain was measured at the end of year 2, using a retrospective pre-post design (or "thentest") in which teachers were asked to rate their knowledge of each trauma-related concept 'before' the project and 'now'. This design can be useful first because it minimizes response shift bias sometimes seen in traditional pre-post comparisons particularly when study participants lack sufficient information about their level of functioning at pre-test or because they have an incomplete understanding of the survey items at pre-test (Howard et al., 1979; Sprangers & Hoogstraten, 1989). This is particularly a risk when survey items contain words describing unfamiliar concepts (e.g. terms like 'trauma reminders' or 'retraumatization' or 'protective factors'). Second, it is particularly useful for assessment of subjective experiences of program-related change (Hill & Betz, 2005; Nimon et al., 2011). Further, it is useful for pragmatic reasons in that it allows a way to measure perceived knowledge gain or practice change for teachers who entered the project at various times and because it provides a way for matching of pre-post evaluations for anonymous responses. We used independent sample t-tests to explore change in TI knowledge over time.

We used a similar approach to teacher ratings of the frequency of their implementation of key trauma-informed care teaching strategies, but included measures in both year 1 and year 2. This allowed us to look at the frequency of teaching strategies from the point at which a teacher entered the project, to the end of year 1 and then the end of year 2. We used independent sample t-tests to explore change the use of TI teaching practices from the beginning of year 1 to the end of year 2. On a subset of survey items related to trauma-informed teaching strategies, we gathered information anonymously at multiple points in time to explore whether the gains teachers reported making in trauma-informed teaching practices were sustained in year 2. For these analyses we used summary t-tests to look at change in the group mean for each item from the beginning of year 1 to the end of year 1, and then from the end of year 1 to the end of year 2.

To address questions about the experience of Change Team members we surveyed all change team participants at the end of the second year of the project. We used descriptive

Table 3 Teacher-reported frequency of use of trauma-informed teaching strategies in year 1 (N=87)

Scale	Before Project Mean (SD)	End of Year 1 Mean (SD)
Use of Relationship Building Strategies	2.52 (0.66)	3.20 (0.56)***
Supporting Feelings Identification	2.73 (0.86)	3.29 (0.55)***
Teaching/Practicing Self-Regulation	2.76 (0.93)	3.49 (0.52)***
Preparing for/utilizing crisis plan	2.28 (0.87)	2.93 (0.84)***

*p < .05, **p < .01, ***p < .001

Table 4 Teacher/staff-reported sustainability of implementation of specific trauma-informed care teaching strategies across years

Brief description of teaching strategy	Before Project Mean (SD) N=91	End of Year 1 Mean (SD) N=91	End of Year 2 Mean (SD) N=73
Viewing behavior concerns as potentially trauma-related.	2.37 (0.77)	3.14*** (0.81)	3.44** (0.60)
Implementing emotional literacy activities in the classroom	2.58 (1.03)	3.16*** (0.70)	3.64*** (0.60)
Implementing individualized relationship building plans for target children.	2.29 (0.87)	3.08*** (0.70)	3.51*** (0.69)
Implementing universal relationship-building activities each day	2.81 (0.86)	3.38*** (0.64)	3.64** (0.58)
Teaching self-regulation skills routinely.	2.75 (1.03)	3.50*** (0.57)	3.66 (0.62)
Helping children practice self-regulation when upset.	2.83 (0.90)	3.48*** (0.59)	3.71* (0.56)

*p < .05, **p < .01, ***p < .001

statistics to describe their level of agreement with each survey items (see Table 3).

Measures

Trauma-Related Knowledge

To assess trauma related knowledge, we created a survey covering two domains of content covered in FIRST:ECE training: general trauma knowledge (six items focused on the meaning of childhood trauma and its impacts on children, Cronbach alpha=0.92) and knowledge of trauma-informed care (four items focused on trauma-informed school concepts, Cronbach alpha=0.87). Sample items include “I know about several ways that child trauma impacts children’s brains and bodies” and “I am able to identify several protective factors that will help children recover from trauma”. Teachers were asked to rate their understanding of

Table 5 Change team feedback survey on process to support organizational change (N=14)

Brief Version of Survey Item	Percent Agreement
1. Our change team members represented diverse roles.	92.9
2. Change team members shared their ideas and opinions.	92.9
3. I understood my role as a change team member.	92.9
4. I understood the mission/goal of our change team.	92.9
5. Change team members gathered input from peers.	92.9
6. Our change team created new resources/tools and/or processes/procedures that were helpful for our school.	78.6
7. Our change team met regularly and made progress toward goals.	92.9
8. We are equipped to continue to support a trauma-informed school.	85.8
9. I would recommend that other schools form a change team.	85.8

these trauma concepts before the project began and at the end of the project (on a 1 to 4 scale representing ‘not at all’ to ‘very much’).

Trauma-informed Teaching Strategies

To assess increase in use of trauma-informed classroom teaching strategies, we created a survey covering key teaching practices that all staff would have opportunity to implement. Items were grouped into four scales (see Table 4) ranging from 2 to 5 items per scale: building supportive relationships (Cronbach alpha=0.81), teaching feelings-identification (Cronbach alpha=0.79), supporting self-regulation (Cronbach alpha=0.91), and trauma-informed approaches to significant behavioral crises (Cronbach alpha=0.73). This survey was used in year 1, and teachers rated frequency of their implementation of these key trauma-informed care teaching strategies at the beginning and at the end of year 1 on a 1 to 4 scale representing ‘rarely’ to ‘always’. To explore sustainability of key practices that were everyday strategies that can be used by all teaching staff regardless of role, our year 2 survey repeated a subset of these items (shown in Table 5) as well as an additional question about use of self-care strategies.

Growing Capacity to Support Organizational Change

We created a survey designed to evaluate the extent to which the Change Teams members (a small subset of teachers and administrators tasked with supporting organizational changes outside the classroom) understood their mission and roles, operated in ways that were inclusive (e.g. diverse members, all voices encouraged) and build their capacity

to support organizational change going forward. Items are shown in Table 3.

Results

A record review of planned activities show that all trainings were largely implemented as planned. In year 1, seven coaching visits were planned for each teaching staff member, and an average of 6.48 visits per classroom were completed. The coaching plan also allowed for routine planned and ‘as-needed’ informal contact via e-mail, phone or text and each classroom teaching team received an average of 31.7 contacts over the course of year 1. In year 2, FIRST:ECE planned to facilitate eight peer support meetings (designed to foster sustainability of TI practices among teachers) per ECE site/location, and actually facilitated an average of 7.41 per site. Change team visits were scheduled monthly from September through April and occurred as planned in year 1. These meetings included lead teachers, assistant teachers/paraprofessionals, and administrators. In year 2, meetings were disrupted by the Covid-19 pandemic in March 2020, but continued virtually at one site. At the second site, the change team meetings were suspended while meetings with program administration continued through the end of the school year. FIRST ECE also facilitated three senior administrator meetings, which consisted of the change team facilitator and the senior administrators (director and assistant director) of both Pre-K programs.

In terms of increases in knowledge about childhood trauma, teachers reported mean increases on the General Trauma Knowledge scale from 2.37 (SD=0.62) to 3.69 (SD=0.39) $t=17.82(df=72)$ $p<.001$. Similar increases were reported in teacher Knowledge of Trauma-Informed Schools, with mean increases from 2.23 (SD=0.76) to 3.67 (SD=0.45) $t=-14.23(df=72)$ $p<.001$.

Table 4 shows the frequency with which teachers reported implementing key trauma-informed care strategies designed to build resilience in children (e.g. supporting self-regulation) before the project and at and of year 1. Based on a mean of the items from each scale, scores reflect the frequency of use of the strategies. On average, the mean frequency of use at pre-test equates to a response of ‘sometimes’, which increased over time to a mean score reflecting responses in-between ‘often’ and ‘always’.

Table 5 shows the results of our analysis exploring the sustainability of use of specific routine TI / resilience building teaching strategies. Table 5 shows the specific strategies, and their average reported use at the three time points (ratings on a 1 to 4 scale representing ‘rarely’ to ‘always’). As expected, there were significant gains across year 1 in frequency of use. Unexpectedly, there were additional gains

made from year 1 to the end of year 2. This reflects not only sustainability of these teaching strategies, but increased growth in use of those strategies. Also in year 2, staff were also asked to report on their frequency of use of a self-care strategy designed to reduce stress and reported an increase in frequency from 2.08 (SD=0.88) to 3.26 (SD=0.75) $t=-12.10(df=71)$ $p<.001$

Table 3 shows feedback from 14 staff and administrators who were participants in the Change Team meetings during either year 1 or year 2 of the project (or both). As seen in Table 3, most staff reported feeling the process was inclusive, that they understood their role, made progress toward their goals and that they feel equipped to continue the work.

Discussion

The purpose of our study was to investigate the short and intermediate outcomes of Trauma-Informed Schools (TIS) initiatives with the goal of building the ‘chain of evidence’ for implementing a TIS framework in early childhood education settings. The three prongs of FIRST ECE (i.e., all-staff training, more intensive training and support for teachers, and organizational change efforts) were implemented in two multi-site pre-K programs that were geographically diverse. The first purpose of our study was to determine the extent to which it was feasible to implement the FIRST:ECE intervention activities as planned over the course of two years, particularly given the relatively intensive nature of the intervention. Our results suggest there were few deviations from the plan. Trainings occurred as expected, and on average, teachers received more than 90% of the implementation support activities (coaching and peer support meetings) that were planned. Unexpectedly, there was a higher than expected volume of informal contact between coaches and teachers (e.g. email, phone calls, texts). While many ECE programs may not have a level of readiness that would allow for successful implementation of such an intensive intervention, our results suggest it can successfully occur in certain contexts.

The second purpose of our study was to examine preliminary evidence that we were able to meet the goals of our FIRST:ECE program, including increasing trauma-related knowledge, TI classroom practices and TI organizational change. In terms of increasing trauma-related knowledge, results point to a significant increase in teacher-reported knowledge of key concepts related to childhood trauma (e.g. impacts of trauma on child development) and trauma-informed care (e.g. ways to avoiding retraumatization and build resilience). It is important to note the increase in knowledge occurred in a group of mainly seasoned early childhood educators who had substantial prior training in

children's social-emotional development. Prior research has demonstrated that enhancing teacher knowledge about trauma is associated with increased perceptions of acceptability of trauma-informed approaches (McIntyre et al., 2019).

In terms of evaluating the use of trauma-informed classroom teaching strategies, we primarily focused on teachers' reported use of strategies designed to build resilience in children, including strengthening their relationships with key adults, building emotional literacy, and supporting self-regulation. We also focused on strategies designed to build a sense of safety and avoiding re-traumatization, such as having access to a TI plan for addressing behavioral crises. We found a significant increase in the frequency of teacher-reported use of trauma-informed, resiliency-building teaching strategies after the first year of the project where teachers experienced multiple sessions of trainings followed by goal-setting and coaching visits.

Additional gains in use of these teaching strategies were made in the second year after an additional one-time interactive 'booster' training and problem-based learning (PBL) peer support meetings. In other words, the gains in trauma-informed teaching strategies across year 1 were not only sustained in year 2 but appear to have been further solidified. This is consistent with prior research which suggests that teacher coaching with performance feedback can directly impact teachers' use of important skills in the classroom (Duchaine et al., 2011). Consistent with coaching approaches described elsewhere (Maeda, 2001; Rathel et al., 2008), FIRST:ECE teacher coaching includes (1) identifying a specific goal/commitment based on the interactive training received, (2) discussing ways to achieve the goal, (3) practicing the skill, (4) observing the teacher, and (5) providing feedback. The finding that gains in implementation of TI teaching strategies were sustained and even increased in year 2, points to the possibility that the additional 'booster' professional development and PBL-style meetings may be helpful in sustaining and increasing use of evidence-based teaching strategies. These results are consistent with conclusions from Zhang and colleagues (Zhang et al., 2011) who found that PBL strategies such as open-ended questions built on the teachers' ideas, selective revoicing, making connections, engaging teachers in discussion, and generating ideas for challenging problems that arise in the classroom can be effective teacher professional development strategies. It is important to note that in absence of a comparison or control group, we cannot specifically attribute either the knowledge gains or changes in teaching practices to the FIRST:ECE intervention specifically.

To begin to evaluate the impact of the broader organizational change efforts, spearheaded by agency 'change team', we surveyed those change team members at the end of the

project. Most of the school personnel reported positive feedback regarding inclusive composition of the change team, understanding their role and goals, being able to obtain and share input, creating tools and resources, and making progress towards goals. This was promising feedback regarding the unique value that organizational change efforts could add to the TI schools implementation model. This is especially relevant given the importance of acknowledging an organization's readiness, capacity, infrastructure, needs, and other system variables that could impact sustainable implementation of a comprehensive program such as FIRST:ECE (Melz et al., 2019).

Organizational change theory posits that, in order to promote sustainable change in an organization, awareness, desire, knowledge, ability, and reinforcement are key (ADKAR; (Hiatt, 2006)). In keeping with this framework, FIRST:ECE utilizes interactive training and organizational change efforts to create a sense of urgency regarding the "why" behind implementation of Trauma-Informed Care initiatives. These professional development trainings raised awareness regarding trauma-related knowledge and, ideally, caused school personnel to make a personal decision to get on board with TI approaches (desire). Organizational change efforts (i.e., TI champions) strived to further enhance desire by highlighting the potential benefits (i.e., more tools to handle challenging behaviors, increased teacher confidence, fewer challenging behaviors). Ongoing professional development, teacher coaching, and PBL peer support meetings collectively enhanced teacher knowledge and increased their ability to implement new trauma-informed teaching strategies in a sustainable way. Organizational change team activities focused on meaningful ways to sustain change and newly learned skills.

Our study has several limitations. First, our study includes teacher-reports of implementation of TI teaching strategies, and we were not able to gather observational data to provide an objective view. Second, research on TI organizational change is hampered by a lack of valid and reliable measurement tools (Melz et al., 2019), and we were unable to identify existing appropriate tools to measure the constructs of interest in this study. Third, we gathered anonymous data at multiple time points throughout the two years of the project, without the ability to track individual teachers over time to learn more about the dose of the intervention each teacher received, how teacher turnover may have impacted the results, etc. Fourth, without a more rigorous design, including a control group, we are unable to know what changes may be attributable to the FIRST:ECE intervention and which changes may have occurred for other reasons. Measuring systems outcomes is extremely resource intensive (particularly in large school systems), but

more rigorous designs are needed to move the field forward (Melz et al., 2019).

While our study is not without limitations, to our knowledge, this is the first evaluation of an initiative targeting TI organizational change in ECE programs at multiple levels: knowledge gain among teaching staff, teacher practice change and broader organizational changes (e.g., changes to policies, procedures, partnerships, etc.). Our findings suggest that change at multiple levels of ECE organizations may be possible, at least based on the perception of ECE program staff. This study represents an early step in building ‘chains of evidence’ in support of the hypothesis that TI organizational change approaches can be effective in ECE settings. Additional evaluations, including with more rigorous designs, will be needed to focus on longer-term outcomes, such as changes in children’s social-emotional development and behavior.

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