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#### ENHANCING EARLY INTERVENTIONISTS' ABILITIES TO SUPPORT CAREGIVER

#### LEARNING THROUGH MULTI-COMPONENT, TECHNOLOGY-MEDIATED INSERVICE

#### PROFESSIONAL DEVELOPMENT

by

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A Dissertation Submitted to the Faculty of Old Dominion University in Fulfillment of the Requirements for the Degree of

#### DOCTOR OF PHILOSOPHY

#### EDUCATION, SPECIAL EDUCATION CONCENTRATION

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#### ABSTRACT

#### ENHANCING EARLY INTERVENTIONISTS' ABILITIES TO SUPPORT CAREGIVER LEARNING THROUGH MULTI-COMPONENT, TECHNOLOGY-MEDIATED PROFESSIONAL DEVELOPMENT

Dana C. Childress Old Dominion University, 2017 Director: Dr. Sharon Raver-Lampman

In order to have qualified service providers from a variety of disciplines (e.g., early childhood special education, physical therapy, occupational therapy, speech-language pathology) who are well-prepared to provide effective early intervention (EI), high quality professional development is needed that is easily accessed by service providers and enhances their abilities to implement specific, evidence-based intervention practices with children and families. Because of the family-centered nature of EI, service providers must be knowledgeable about how to support caregiver learning during EI visits, using practices that are grounded in adult learning theory. The case study research project described in this dissertation addresses those needs by outlining the development, facilitation, and evaluation of a brief multi-component, technology-mediated inservice training course entitled, Using Adult Learning Strategies to Support Caregivers during Early Intervention Visits. This training course included ongoing, embedded support and was provided for nine EI service providers who were currently practicing within the Infant and Toddler Connection of Virginia, the Commonwealth's EI system. A within-subjects pre-posttest design was used to evaluate the 6-week training course to determine the effects of participation on: 1) service providers' use of four EI adult learning strategies (e.g., reflective conversation, caregiver practice with feedback, collaborative problem-solving, and joint planning); 2) providers' changes in knowledge about adult learning and how to apply the adult learning

strategies during EI visits with families; and 3) providers' perceptions of the effectiveness of the multi-component, technology-mediated training course.

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### DEDICATION

This work is dedicated to the infants, toddlers, and their families with whom I have been so fortunate to work in early intervention. They changed how I saw the world and helped me find my professional path. They taught me more than I could have ever taught them.

#### ACKNOWLEDGEMENTS

I could not have traveled this journey without the support of the faculty, fellow students, and of course, my dissertation committee members. I would like to extend my heartfelt gratitude to my major professor and dissertation chair, Dr. Sharon Raver-Lampman, for her guidance, support, and belief in me. My friends and colleagues at the Partnership for People with Disabilities and across the early intervention field cheered me on, picked me up when I stumbled, and helped me persevere. Most of all, it was the love, laughter, and patience of my family, especially my husband and son, that kept me going as I worked toward my goal. There are no words to thank them enough. Hugs and eternal gratitude will have to do.

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#### **CHAPTER 1**

#### **INTRODUCTION**

Early intervention (EI) is a system of supports and services designed to build the capacity of families to meet the needs of their infants or toddlers, ages birth to 36 months, with developmental delays or disabilities. The federal requirements for EI are outlined under Part C of the Individuals with Disabilities Education Act (IDEA, 2004). Within these requirements, an infant or toddler who exhibits a developmental delay or disability, and his or her family, may be eligible to receive EI services. These services are provided by a qualified professional who assists the caregiver in identifying intervention strategies that enhance the child's development during daily routines and activities. EI services are provided using family-centered practices, which emphasize the substantial effect family interactions, activities, and environments have on a child's development (Bailey, Raspa, & Fox, 2012; Bronfenbrenner, 1986; Bruder, 2010; Moore, Barton, & Chironis, 2014; Odom & Wolery, 2003; Yang, Houssain, & Sitharthan, 2013). When providing EI services, professionals partner with caregivers during intervention visits to practice and refine intervention strategies so caregivers are well-prepared to support their child's development between visits, during everyday family interactions and activities when most children's learning occurs (Childress, 2015).

#### **Early Intervention Services and Service Providers**

An array of service options is available to children and families in the EI system. All eligible children and families receive service coordination, which is a case management service designed to ensure that services are well-coordinated and families are linked with needed resources. The most common direct intervention services include speech therapy, special instruction, physical therapy, and occupational therapy (Hebbler et al., 2007; Raspa, Hebbeler, Bailey, & Scarborough, 2010). Which service(s) a child and family receives depends on each child's unique strengths, needs and abilities; the priorities the family identifies related to the child's development; the intended outcomes written on the Individualized Family Service Plan (IFSP); and the amount and type of support needed by the family to help the child achieve the outcomes (Hill & Childress, 2015). The service coordinator works closely with the family and the rest of the EI team to develop the IFSP and determine which service(s) is most appropriate to support the child's development within the context of the family.

EI services are provided in a child's natural environment, which includes the places where the child and family spend time, as well as places where young children without disabilities spend much of their time (Bruder, 2010; Campbell, Sawyer, & Muhlenhaupt, 2009). Most EI services are provided through intervention visits occurring in families' homes (Campbell & Sawyer, 2009; Dunst, Bruder, & Epse-Sherwindt, 2014; McWilliam, 2012). Other natural environments could include a child care center, relative's home, or other community setting such as a local park, a grocery store, a family's favorite restaurant, or any other setting in which intervention is needed or could be helpful to the child and family. To be most effective, EI services must be individualized to meet the needs and priorities of the child and family in their natural environments (Bruder, 2010; Swanson, Raab, & Dunst, 2011). The individualized, family-centered nature of EI is unique among educational and therapeutic service delivery systems, and adapting interventions to the environments and individual needs of each child and family has been consistently found to be challenging for EI service providers across the field (Salisbury, Cambray-Engstrom & Woods, 2012; Woods & Kashinath, 2007; Woods, Wilcox, Friedman, & Murch, 2011).

#### **Challenges of Implementing Early Intervention Practices**

Several reasons have been suggested for the struggle with implementing family-centered practices in EI, including: 1) inadequate preservice training across disciplines (Broggi & Sabatelli, 2010; Campbell & Coletti, 2013; Kyzar et al., 2014; Sawyer & Campbell, 2012; Stremel & Campbell, 2007); 2) a lack of operationalized behaviors describing what practices look like and how to implement them (Bruder, 2010; Dunst & Trivette, 2009; Friend, Summers, & Turnbull, 2009; Odom, 2009; Stremel & Campbell, 2007); and 3) ineffective professional development for inservice practitioners designed to enhance the implementation of EI practices (Bruder, 2010; Bruder, Dunst, Wilson, & Stayton, 2013; Bruder, Mongro-Wilson, Stayton, & Dietrich, 2009; Campbell & Sawyer, 2009; Dunst, Trivette, & Deal, 2011; Snyder, Hemmeter, & McLaughlin, 2011). According to Snyder et al. (2011), many practitioners enter the field with limited to no specific knowledge of how to implement family-centered practices. Those who provide direct services, such as physical therapy, occupational therapy, speech therapy or special instruction, typically come from professional backgrounds in which they were well-trained to work with children in therapeutic clinics or classrooms. Many of those providers have limited experience with providing EI services in natural environments. Their limited knowledge and lack of experience partnering with caregivers to provide intervention in the context of family interactions and everyday routines, combined with what appears to be a lack of effective professional development after they enter the field, makes working in natural environments challenging for many service providers (Kyzar et al., 2014). Each of the reasons for this struggle will be discussed.

Inadequate preservice preparation. The variability in preservice knowledge and experience across EI service providers from different disciplines has been described as one possible reason for the persistent research to practice gap in existence for more than 25 years (Dunst, 2009; Stremel & Campbell, 2007). The research to practice gap is reflected in the frequently identified difficulties service providers experience when attempting to apply childfocused practices that may work in an educational or clinical setting to family-centered intervention in home and community environments during daily family routines (Salisbury, Woods, & Copeland, 2010). Service providers appear to be aware of the importance of providing family-centered, routines-based intervention during EI, but struggle to use practices that enhance the child's learning during intervention visits through interactions with the caregiver (Salisbury et al., 2010; Sawyer & Campbell, 2009; Sawyer & Campbell, 2012). Observations of intervention visits often reflect a more traditional, child-focused model of services, in which the professional intervenes with the child while the caregiver passively observes or is not involved at all (Sawyer & Campbell, 2009; Stremel & Campbell, 2007). For example, the service provider might sit on the floor to join the child during toy play to teach the child missing developmental skills, while the caregiver sits nearby to watch the interaction, rather than participate in it. The caregiver's role is one of a passive observer, who may even leave the room, believing that the service provider's work with the child is the most important event to occur during the visit. Intervention using child-focused practices emphasizes what the service provider can accomplish with the child during the visit, rather than what the caregiver can learn during the visit and use in-between visits with the child. This more traditional model of intervention is illustrative of how many providers were trained at the preservice level and has been found to be less effective in

addressing the child's needs and affecting positive child and family outcomes when used in the context of EI (Campbell, Chiarello, Wilcox, & Milbourne, 2009; Woods & Kashinath, 2007).

Lack of operationalized practices. Another possible reason for the difficulty service providers experience with implementing family-centered EI is a lack of operationalized practices specifically describing what to do on visits with children and families. With the emergence of implementation science, there has been a call among leaders in the field to identify evidencebased practices and their procedural components so that service providers can more easily identify, adapt and use them in their work (Dunst & Trivette, 2009; Dunst, Trivette, & Raab, 2013; Fixsen, Naoom, Blase, Friedman, & Wallace, 2005; Friend et al., 2009; Kemp & Turnbull, 2014; Odom, 2009). Implementation science refers to an emerging field of research designed to identify evidence-based practices and their procedural components in order to increase the use of these practices by a field's practitioners (Cook & Odom, 2013; Dunst et al., 2013; Fixsen et al., 2005). Without well-defined, evidence-based practices, EI service providers resort to using the traditional approach previously described which is not aligned with recommended practices and key principles of effective EI (Division for Early Childhood, 2014; Fleming, Sawyer, & Campbell, 2012; Salisbury & Cushing, 2013; Salisbury et al., 2010; Workgroup on Principles and Practices in Natural Environments, 2008).

The use of family-centered, capacity-building practices has been associated with positive outcomes for children and families (Bruder, 2010; Dunst et al., 2014; Swanson et al., 2011). Specific intervention practices that help caregivers: 1) identify naturally occurring child learning opportunities and interests that enhance child development, 2) strengthen caregiver-child relationships and responsiveness to their children, 3) emphasize caregivers' awareness and interpretation of their own actions, and 4) facilitate active caregiver participation and decision-

making have been found to be effective in positively impacting child and family outcomes (Bruder, 2010, Dunst & Trivette, 2009; Dunst et al., 2014; Mahoney, 2009; Swanson et al., 2011). Determining the specific steps involved with using these practices is necessary so that service providers can be effectively trained to adopt and implement them.

Recent efforts in the EI field have focused on identifying intervention practices that facilitate learning for the caregiver, who will be responsible for implementing intervention strategies with the child when the service provider is absent. These practices are grounded in adult learning theory and integrate the learning needs of *both* the caregiver and the child during the intervention visit (Kemp & Turnbull, 2014; Raab, Dunst, & Trivette, 2010; Rush & Shelden, 2011; Woods & Brown, 2011; Woods et al., 2011). According to Raab et al. (2010) and others (Rush & Shelden, 2011; Woods et al., 2011), the learning needs of the caregiver are recognized in intervention strategies that help him or her: 1) build on prior knowledge, 2) actively participate in the learning process, 3) apply knowledge immediately, 4) practice what is being learned in real-time, and 5) receive feedback on learning and performance. Because many service providers were trained to work with children, using strategies that focus on the adult's (e.g., parent, other caregiver, child care provider) learning during the visit may be unfamiliar and may require further training. Using these practices implies that service providers understand that the best way to impact the child's development is within the context of interactions between the caregiver and the child. During those interactions, the use of coaching, which includes adult learning strategies, is emerging as an effective practice for service providers to use to promote caregiver learning during visits with families (Kemp & Turnbull, 2014).

Early childhood coaching has been identified as a promising practice that shifts the focus of the intervention visit from being solely on the child's learning to emphasizing the caregiver's learning and active participation during the visit as well (Kemp & Turnbull, 2014; Rush & Shelden, 2011). In their research synthesis of adult learning methods, Trivette, Dunst, Hamby, and O'Herin (2009) identified coaching as one of four learning methods associated with positive outcomes for adult learners across a variety of professional and educational backgrounds. Rush and Shelden (2011) have specified these practices in their description of early childhood coaching as incorporating: 1) joint planning; 2) observation; 3) action; 4) reflection; and 5) feedback. Adult learning is also emphasized in the collaborative consultation and caregiver coaching strategies used in the Family-Guided Routines-Based Intervention (FGRBI) approach (Brown & Woods, 2012; Woods et al., 2011). The FGRBI approach includes these five specific process components that facilitate adult learning through coaching: 1) direct teaching, 2) demonstration, 3) guided or caregiver practice with feedback, 4) problem-solving, and 5) reflection (Friedman, Woods, & Salisbury, 2012; Marturana & Woods, 2012). Evidence of the effectiveness of using coaching practices with caregivers to facilitate adult learning during visits is emerging (Kemp & Turnbull, 2014).

**Ineffective inservice professional development.** As specific practices like coaching are identified, described, and refined, service providers who are currently working in the field must receive training in how to use them. Leading experts in the field (Buysse, Winton, & Rous, 2009; Dunst, 2015; National Professional Development Center on Inclusion, 2008) suggest there is a lack of consistent, effective professional development across EI. Though all states that receive federal funding under Part C of IDEA are required to have a comprehensive system of personnel development (CSPD) to support the inservice professional development of their providers, the scope of these efforts vary across the country (Bruder et al., 2009). According to Section 303.118 of IDEA (2004), a CSPD must address the preparation of "providers who are fully and

appropriately qualified to provide EI services." Requirements that identify who is fully qualified and how qualification is measured are determined at the state level. Professional development requirements, such as format (e.g., face-to-face, online, print-based), content, intensity (number of required hours), and initial and ongoing certification requirements (if any) vary from state to state and depend on state-level funding, staffing, and other issues. This variability, combined with the limited preservice preparation many providers receive, affects the quality of the services delivered to infants and toddlers and their families and is consistently indicated in the EI empirical literature as a critical issue that needs to be addressed (Campbell et al., 2009; Catalino, Chiarello, Long, & Weaver, 2015; Dunst, 2009; Snyder et al., 2011; Snyder et al., 2012).

#### **Recommendations for Effective Professional Development**

Similar to what is described in other fields, such as medicine, education, and mental health, the predominant means of providing EI professional development is via face-to-face workshops (Bruder et al., 2009; Kretlow & Bartholomew, 2010; Snyder et al., 2011). One-time, face-to-face workshops have been found to be ineffective when changing professional practices is the goal (Church, Bland, & Church, 2010; Dunst & Raab, 2010; Dunst et al., 2011; Fixsen et al., 2005; Marturana & Woods, 2012). Evidence from the adult learning and professional development literature suggest that achieving positive learner outcomes during training requires opportunities for the adult learner to: 1) plan for learning, 2) practice and apply what is being learned, and 3) achieve a deep understanding of learned content through reflection and self-assessment (Dunst, 2015; Dunst & Trivette, 2009; Trivette et al., 2009). In their meta-analysis of 79 studies in which adult learning methods were used, Trivette and colleagues (2009) reported that learning opportunities that included all three components (e.g., planning, application, and deep understanding) resulted in more positive outcomes for adult learners. Adult learners in the

Trivette et al. (2009) synthesis included adults from diverse professional and educational backgrounds (not just EI) who attended training associated with their academic area of study or their employment. Impactful learning opportunities incorporated multiple methods of instruction and multiple opportunities for learning, including content-based learning that actively engaged the learner in the learning process, ongoing coaching or mentoring to support learners' abilities to generalize and sustain learning, and learner self-assessment of understanding, application, and mastery (Penuel, Fishman, Yamaguchi, & Gallagher, 2007; Snyder, et al., 2012; Trivette et al., 2009).

Examples of multi-component professional development from the EI and special education literature include face-to-face or online workshops or modules followed by on-site coaching or mentoring (Dunst et al., 2011; Hobbs, Foster, Pritz, & Kelley, 2011; Kyzar et al., 2014), and workshops followed by ongoing peer and individual coaching using distance technology (Marturana & Woods, 2012). The use of coaching in professional development is considered a promising practice and is frequently recommended for further investigation (Annenberg Institute for School Reform, 2004; Kretlow & Bartholomew, 2010; Kretlow, Cooke, & Wood, 2012). Distance technology is emerging as a useful means of providing easily accessible professional development in the EI field, and may address concerns shared by EI service providers related to time and travel required to participate in workshops, which have been indicated as barriers to professional development (Vismara, Young, Stahmer, Griffith, & Rogers, 2009).

Further research is needed regarding how to implement effective professional development that positively impacts service provider learning outcomes. Of particular interest are those outcomes related to the implementation of practices that support caregiver learning during EI visits. For professional development research to be replicable in the "real world," it must also address how to meet the needs of service providers and state-level professional development staff, both of whom have limited time and resources to access and provide such needed training opportunities. Effective professional development in EI must help service providers: 1) identify specific family-centered, evidence-based practices, 2) recognize what these practices look like when used during intervention visits, and 3) apply these practices in their work with families. Professional development opportunities must also be provided using training methods that are accessible to service provider learners and manageable for state-level CSPDs. Research that identifies the components of EI professional development (e.g., the processes used for how professional development is provided) and supports service providers in using effective family-centered practices in their work is needed.

#### **Statement of the Problem**

In order to have qualified service providers from a variety of disciplines (e.g., early childhood special education, physical therapy, occupational therapy, speech-language pathology) who are well-prepared to provide effective EI, high quality professional development is needed that is easily accessed by service providers and enhances their abilities to implement specific, evidence-based intervention practices with children and families. Because of the family-centered nature of EI, service providers must be knowledgeable about how to support caregiver learning during EI visits, using practices that are grounded in adult learning theory. The research project described in this dissertation addresses those needs by outlining the development, facilitation and evaluation of a brief multi-component, technology-mediated inservice training course for EI service providers currently practicing in the EI field from the most commonly represented

disciplines within the Infant and Toddler Connection of Virginia, the Commonwealth's EI system (e.g., education, physical therapy, occupational therapy, speech-language pathology).

Virginia's EI system permits providers with varying levels of education to provide services to children and families. For example, EI assistants who provide special instruction have a minimum requirement of a high school diploma with related experience. Physical therapy and occupational therapy assistants have a minimum requirement of an associate's degree, and fully qualified providers across disciplines have a minimum of a bachelor's degree with licensure (when required to provide a specific service). All providers in Virginia must complete certification requirements, which include the completion of a series of asynchronous, online training modules that provide an overview of EI, recommended practices for service delivery, and the EI process from initial referral to transition out of the system. These modules are available through the Virginia Early Intervention Professional Development Center's website, www.veipd.org/main/. The achievement of these minimum educational requirements and completion of the foundational level certification modules do not ensure that providers are wellversed in the use of evidence-based practices for supporting caregiver learning during visits. Further training is needed to address the specific processes involved with effective service delivery. This research is designed to meet that need for further training.

Both the delivery and content of the multi-component, technology-mediated inservice training course described herein was grounded in adult learning theory and used adult learning practices drawn from the coaching and professional development literature to support participants during the technology-mediated training course and a single follow-up interview. Using adult learning theory and coaching practices in the *delivery* of this technology-mediated, inservice training course allowed participants to experience the application of the theory and the use of coaching practices during the training. The trainer, who is also the researcher, modeled how to integrate principles of adult learning theory into interactions with adult learners. The trainer also taught participants how to apply adult learning principles and associated EI adult learning strategies (which were drawn from the coaching literature) in their work with families during EI visits. Experiencing and reflecting on the application of adult learning theory both as a learner participant in the training course and as a facilitator of learning for caregivers during EI visits was expected to result in a deeper understanding of the training content, which, according to Joyce and Showers (2002), is needed for generalization of knowledge and skills from professional development. Grounding the training content of the technology-mediated, inservice training course in adult learning theory was expected to help participants make the connection between family-centered, coaching practices that include adult learning strategies and their effects on caregivers as adult learners. See Tables 1-6 for an overview of the technologymediated, inservice training course content plan.

### Table 1

Session	Session	Content Overview	Instructional	Instructional Activities	Assignment
Title	Туре		Materials		
Adult	Interactive	Introduce five	Power Point slide	Web-based chat (session	Reading:
learning and	webinar	principles of adult	deck	opener):	Trivette, C. M.,
its		learning theory:		Introduce yourself to your	Dunst, C. J., Hamby,
application		#1: Adults learn best	Adult Learning Quick	colleagues in chat by telling	D. W., O'Herin, C.
in early		when what is being	Reference Guide	us your name, role,	E. (2009).
intervention		learned is		program/location, and an	Characteristics and
		immediately relevant		insight about your own	consequences of
		and useful to them;		practices related to	adult learning
		#2: Adults learn best		supporting caregiver	methods and
		when new knowledge		learning that you learned	strategies. Research
		is built on prior		from your pre-training	Brief Volume 3,
		knowledge;		video.	Number 1. Tots n
		#3: Adults learn best			Tech Research
		through active		Web-based chat about	Institute.
		participation and		discussion questions:	
		practice;		What are the characteristics	Self-Assessment:
		#4: Adults learn and		of a learning experience	How are you
		remember most		that facilitate	supporting caregiver
		successfully when		adult/caregiver learning?	learning during El
		what they are learning			visits? (See
		is practiced in context		How can you apply this	Appendix D)
		and in real time;		adult learning principle	<b>T</b> T T T T T
		#5: Adult learners		during EI visits? (asked for	Video example:
		want feedback on		each principle)	Coaching a family
		their learning and		<del></del> , , ,	during an early
		performance		How do you help caregivers	intervention visit
				plan for their learning?	

# Technology-mediated Inservice Training: Session 1

### Table 1 Continued

Session	Session	Content Overview	Instructional	Instructional Activities	Assignment
1 itle	Гуре	Discuss three components to adult learning that are associated with	Materials	How do you help caregivers apply their learning during visits? Between visits?	(https://youtu.be/ZDx 9L6yPMZU)
		positive outcomes for learners: 1) planning, 2) application, and 3) deep understanding (Trivette et al., 2009)		How do you help caregivers achieve deep understanding of how to use intervention strategies?	
		Connect adult learning to caregiver coaching in early intervention and the need for caregivers to be able to use		Web-based interactions using whiteboard tools (i.e., polling, matching, textbox) to indicate: <i>Which strategy is</i> <i>associated with planning?</i>	
		strategies during and between visits when the service provider is not present		Which strategy is associated with application?	
				Which strategy is associated with deeper understanding?	

# Table 2

Session	Session	Content Overview	Instructional	Instructional Activities	Assignment
Title	Туре		Materials		
Self- assessment and	Embedded support	Share insights learned from each participant's self-	Power Point slide deck	Web-based chat (session opener): Share a quick update about	Readings: Childress, D. (2014, May 15). Adult
reflection: How are you supporting caregiver		assessment, including strengths and plans for improvement	Self-assessment: How are you supporting caregiver learning during EL visits?	your week related to supporting caregiver learning	learning principles series [Web log messages]. Retrieved from
learning during EI visits?				Web-based or live chat about discussion questions: <i>What did you find to be</i>	http://veipd.org/earlyi ntervention/
				your strengths with supporting caregiver learning?	Joint plan: Address skill identified for improvement during
				What skills do you need to build?	visits in the next 2 weeks
				Live chat: Each participant will have five minutes to share insights based on the self-assessment followed by group reflection, problem- solving and feedback	
				Web discussion and live chat about challenges with facilitating caregiver	

# Technology-mediated Inservice Training: Session 2

### Table 2 Continued

Session Title	Session Type	Content Overview	Instructional Materials	Instructional Activities	Assignment
				learning during visits	
				Web-based chat: Each participant will have one minute to share a joint plan for improvement of professional practices, identifying 1 skill he/she will target during the next 2 weeks	

# Table 3

# Technology-mediated Inservice Training: Session 3

Session Title	Session	Content Overview	Instructional	Instructional Activities	Assignment
	Туре		Materials		6
Using EI	Interactive	Discuss how the adult	Power Point slide	Web-based chat (session	Reading:
adult	webinar	learning principles	deck	opener):	TaCTICS. (n.d.). 8
learning		support the use of		Share a reflection from your	concepts from adult
strategies to		reflective	Case scenario	week, a "ah-ha" moment or	learning you can use
support		conversation,	illustrating the use of	success.	to support
caregiver		caregiver practice	the EI adult learning		caregivers. Retrieved
learning		with feedback, and	strategies while	Web-based chat about	from
DURING the		collaborative	coaching a family	discussion questions:	http://www.thearcalli
El visit		problem-solving		How do you find out about	ance.org/downloads/
		during visits with		what is immediately	Resources/8-
		Tammes		relevant and useful to	A dult Learing Vou
		Discuss how these		jamilies?	Con Use to Support
		three FI adult learning		What is your experience	Caregivers pdf
		strategies can be used		with reflective	Calegivers.pui
		to help caregivers		conversation? Easy? Hard?	Self-assessment:
		apply what they learn		Why?	Using EI adult
		during visits with			learning strategies to
		their children		What challenges do you	apply adult learning
				face with facilitating	principles during EI
				caregiver practice? With	visits (See Appendix
				providing feedback?	E)
				How do you find out about	Video example:
				the contexts in which	Coaching in action
				<i>families need intervention?</i>	(https://youtu.be/ziC olpqpLIo)

### Table 3 Continued

Session Title	Session	Content Overview	Instructional	Instructional Activities	Assignment
	Туре		Materials		
				Which principles and EI	
				adult learning strategies	
				are illustrated in this	
				example? How can you tell?	
				-	

# Table 4

# Technology-mediated Inservice Training: Session 4

Session	Session	Content Overview	Instructional	Instructional Activities	Assignment
Title	Туре		Materials		
Self-	Embedded	Participants will share	Power Point slide	Web-based chat:	Reading:
assessment	support	insights learned from	deck	Share a success from your	Rush, D. D., &
and		the self-assessment	0.10	week related to what we are	Shelden, M. L.
reflection:		and their attempts to	Self-assessment:	learning.	(2008, January). Tips
adult		learning principles	strategies to apply	Web-based chat about	effective coaching
learning		and EI adult learning	adult learning	discussion questions:	interactions
strategies		strategies	principles during EI	What did you find to be	Retrieved from
during visits		C	visits	your strengths regarding	http://fipp.org/static/
		Participants will		implementing the principles	media/uploads/briefc
		receive performance		and strategies?	ase/briefcase_vol1_n
		feedback based on		····	o2.pdf
		their self-assessment		What skills do you need to	Toint alon.
		share one strength and		Dulla?	Joint plan: Address skill
		one challenge related		Live chat: Each participant	identified for
		to using these		will have five minutes to	improvement during
		strategies with		share what resonated with	visits in the next 2
		families during the		them from the reading and	weeks
		previous week		why as well as insights	
				based on the self-	
		Participants will		assessment followed by	
		develop a brief joint		group reflection, problem-	
		plan for improving		solving and reedback	
		coming week		Web-based and live chat	
		coming week		about challenges with	

### Table 4 Continued

Session Title	Session Type	Content Overview	Instructional Materials	Instructional Activities	Assignment
				implementing the EI adult learning strategies.	
				Live chat: Each participant will have one minute to share a joint plan for improvement of professional practices, identifying 1 skill he/she will target during the next 2 weeks	

# Table 5

Session Title	Session Type	Content Overview	Instructional Materials	Instructional Activities	Assignment
Using EI adult learning strategies to support caregiver intervention BETWEEN visits	Interactive webinar	Discuss how the adult learning principles support the use of collaborative problem-solving and joint planning during visits with families Discuss how these two coaching strategies can be used to help caregivers apply what they learn during intervention occurring between visits with their children during	Power Point slide deck Case scenarios illustrating the use of the EI adult learning strategies while coaching a family	<ul> <li>Web-based chat (session opener): Share a tip from the reading that made you pause and think about your own practices.</li> <li>Web-based chat about discussion questions: What is your experience with collaboratively problem-solving with caregivers about using strategies between visits?</li> <li>What questions do you ask to facilitate collaborative</li> </ul>	Readings: Friedman, M., Woods, J., & Salisbury, C. (2012). Caregiver coaching strategies for early intervention providers: Moving toward operational definitions. <i>Infants &amp;</i> <i>Young Children, 24</i> , 62-82. Childress, D. (2015, August 16). 6 key ideas for joint
		children during		to facilitate collaborative	planning with parents

# Technology-mediated Inservice Training: Session 5

### Table 5 Continued

Session Title	Session Type	Content Overview	Instructional Materials	Instructional Activities	Assignment
		everyday activities and routines		problem-solving and joint planning with the caregiver?	[Web log]. Retrieved from http://veipd.org/early intervention/6-key-
				Why is follow-up on the next visit about the joint plan important?	ideas-for-joint- planning-with- parents/
					Self-assessment: How are you supporting caregiver learning during EI visits?

# Table 6

# Technology-mediated Inservice Training: Session 6

Session Title	Session Type	Content Overview	Instructional Materials	Instructional Activities	Assignment
Title Self- assessment, reflection, and planning: How are you supporting caregiver learning now?	Embedded support	Participants will share insights from their review of the initial self-assessment to reflect on changes to their practices over the past 6 weeks Participants will receive performance feedback based on their final self-	Power Point slide deck Self-assessment: How are you supporting caregiver learning during EI visits?	<ul> <li>Web-based chat (session opener):</li> <li><i>How have your practices changed over the last six weeks?</i></li> <li>Web-based and live chat about discussion questions:</li> <li><i>What did you find to be your strengths regarding problem-solving and planning with families?</i></li> </ul>	Continue to apply principles of adult learning theory by using the EI adult learning strategies during EI visits
		assessments Participants will also share their plan for how to continue using what they have learned		What skills do you need to continue to build? How have your practices changed from the first time you completed this self- assessment?	
				Live chat: Each participant will have five minutes to share insights based on the self-assessment followed by group reflection, problem- solving and feedback	

### Table 6 Continued

Session Title	Session Type	Content Overview	Instructional Materials	Instructional Activities	Assignment
				Web-based and live chat about challenges with facilitating collaborative problem-solving and joint planning during visits Live chat: Each participant will have one minute to share a specific goal for maintaining what he/she has learned during the last 6 weeks	

The organization and delivery of this multi-component, technology-mediated inservice training course was founded on evidence-based professional development practices (Dunst, 2015; National Professional Development Center for Inclusion, 2008), including the provision of individualized support embedded within the training course and a single follow-up interview within two weeks following the training course. The embedded support component of the technology-mediated inservice training course was designed to provide participants with opportunities to practice and reflect on what they were learning and receive immediate performance feedback during the training course. The single follow-up interview was designed to offer participants an opportunity to reflect on their learning and their ability to apply what they learned in their work with families since the start of the training sessions. This synchronous training course included six technology-mediated sessions, three of which were interactive webinar sessions focusing on discussion of specific content related to applying adult learning during EI visits. The other three sessions, which were called the "embedded support sessions" and alternated with the content-specific interactive webinar sessions, offered participants opportunities to share their experiences and reflections regarding the immediate use (between training sessions) of what they were learning (see Tables 1-6). To facilitate participants' application of knowledge and skills learned during the technology-mediated inservice training course, information about the use of four specific EI adult learning strategies that are associated with coaching and with facilitating adult learning during interactions with caregivers was taught. See Chapter 3 for the operational definitions and examples of these EI adult learning strategies (Friedman et al., 2012, Rush & Shelden, 2011; Trivette et al., 2009).
## **Theoretical Framework**

The underlying framework for this research project is based on several important theoretical orientations. Content for the multi-component, technology-mediated inservice training course was grounded in the Unified Theory of Practice in Early Intervention/Early Childhood Special Education (Odom & Wolery, 2003) and the Natural Environments Framework (Dunst, Trivette, Humphries, Raab, & Roper, 2001). Each of those outline specific, evidence-based tenets and practices associated with positive outcomes for children (i.e., developmental progress in areas of development previously exhibiting developmental delay and increased participation in daily routines and activities) and families (i.e., increased confidence and competence with meeting the child's developmental needs and supporting the child's participation in daily routines and activities). Training content and delivery integrated adult learning theory as described by Knowles, Holton, and Swanson (2012) into the application of these tenets and practices, in an effort to help participants understand why and how these practices support caregiver learning. Implementation and intervention fidelity was monitored using implementation science (Cook & Odom, 2013; Fixsen et al., 2005). Each of the theoretical frameworks upon which this research project has been drawn will be discussed.

## Unified Theory of Practice in Early Intervention/Early Childhood Special Education

The practices incorporated into the training content are grounded in the Unified Theory of Practice in Early Intervention/Early Childhood Special Education (EI/ECSE; Odom & Wolery, 2003). It provides evidence-based tenets of effective practice when working with young children with developmental delays or disabilities and their families. This unified theory includes eight tenets of practice that service providers can use to guide their beliefs and practices. These tenets include: "1) families and homes are primary nurturing contexts; 2) strengthening relationships is an essential feature of EI/ECSE; 3) children learn through acting on and observing their environment;4) adults mediate children's experiences to promote learning; 5) children's participation in more developmentally advanced settings, at times with assistance, is necessary for successful and independent participation in those settings; 6) EI/ECSE practice is individually and dynamically goal oriented; 7) transitions across programs are enhanced by a developmentally instigative adult; and 8) families and programs are influenced by the broader context" (p. 166).

The multi-component, technology-mediated inservice training course focused on helping service providers understand and apply the first five tenets. Through the application of adult learning principles during visits and an exploration of the use of four specific EI adult learning strategies, participants gained an understanding of family-child interaction as the most appropriate contexts for infant and toddler learning. Participants gained knowledge and experience with applying these tenets to promote child participation in everyday routines and activities through the support they provided to the child's caregivers during the intervention visit. These underlying tenets link closely to the Natural Environments Framework, which further breaks down the settings, roles of service providers, and how EI should be provided during visits with families (Dunst et al., 2001). Each of the characteristics of EI service delivery from the Natural Environments Framework will be discussed.

## **Natural Environments Framework**

According to the Natural Environments Framework proposed by Dunst et al. (2001), there are three continua of practices that can be used to describe EI service delivery in natural environments. The first continuum describes the intervention setting in terms of whether learning

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is *contextualized* or *decontextualized*. When learning is contextualized, which is the preferred type of learning setting according to Dunst et al., it is more meaningful to the child and is provided in settings that are natural for the child's everyday life. Contextualized settings offer the child natural opportunities to learn and practice new skills in meaningful contexts, such as family activities, daily routines, and regular community outings that occur throughout the week. The content for this multi-component, technology-mediated inservice training course focused on how service providers can help caregivers identify contextualized learning opportunities and adapt them to support the child's active participation.

The second continuum describes the type of activity that occurs during the EI visit. This activity is referred to as either *child-initiated* or *adult-directed*. Child-initiated activities are based on the child's interests and motivations. Adult-directed activities are those chosen by the adult to achieve a goal identified as important by the adult. EI in natural environments (such as the home, child care, or other community setting) often includes a combination of both types of activities. The adults follow the child's lead during interest-based activities and adapt the adult-child interaction or environment to help the child develop competencies needed to achieve an outcome identified by the family. Dunst et al. (2001) and Woods et al. (2011) suggest that interventions that are both adult- and child-focused, meaning they are blended to include both the child's and adult caregiver's learning and priorities, are most effective.

The third continuum identifies the primary facilitator of the child's development within the partnership between the caregiver and the service provider (or practitioner). Learning opportunities for the child can be either *practitioner-absent* or *practitioner-implemented*. Practitioner-implemented learning refers to the opportunities that are provided by the practitioner to support the child's learning during the visit. These opportunities tend to be child-focused as the practitioner works directly with the child while the caregiver is passively or not involved. Practitioner-absent learning opportunities represent the many opportunities that occur when the provider is not in the home (or other natural learning environment), between visits and during every day routines. Effective service delivery plans for practitioner-absent learning opportunities by using the EI visit as a practice session for both the caregiver and child to try out intervention strategies in the context of a natural routine with the support of the service provider (Raver & Childress, 2015). Rather than the provider working primarily with the child, the provider uses a variety of instructional methods to facilitate learning for both the child and caregiver, with the ultimate goal of ensuring that the caregiver is well-prepared to use intervention strategies with the child when the provider is absent. This multi-component, technology-mediated inservice training course was intended to help the EI practitioners embrace a practitioner-absent frame of reference for their visits so that they can use coaching practices and strategies grounded in adult learning theory to prepare caregivers for their child's learning that is contextualized and enhanced by a combination of child- and adult-initiated interactions occurring during and between visits.

## **Adult Learning Theory**

According to Woods and Brown (2011), "family-centered principles guide practitioners on what to do, and adult learning theory facilitates how to do it" (p. 241). The application of adult learning theory to EI practice has been a rising topic of discussion in the field for the past 10 years. Evidence is limited about any direct influences of adult learning on EI, but intervention practices that apply adult learning theory, such as early childhood coaching, appear to be promising in terms of their associations with positive outcomes for children and families (Kemp & Turnbull, 2014). Consequently, this multi-component, technology-mediated inservice training course was designed to apply principles from adult learning theory (Kretlow & Bartholomew, 2010; Trivette et al., 2009) to both the delivery of the training and to the content taught to participants. The following five principles of adult learning theory (Childress, 2015; Trivette et al., 2009) were incorporated into the training:

 Adults learn best when what is being learned is immediately relevant and useful. Adult learners, whether in a classroom or home-based setting, are self-directed learners, preferring to participate in choosing what to learn and how to learn it. The delivery of the inservice training course included modeling for participants how to discover what is relevant to families and how to craft intervention to address it. Inservice training course content focused on practical strategies that service providers could use immediately in intervention visits.
Participants were instructed to apply what they learned following each interactive webinar session and asked to reflect on that application during the next embedded support session.
Participants also learned during the training why providing EI that focuses on family priorities and immediate concerns helps motivate caregivers to use intervention strategies with their children.

2) Adults learn best when new knowledge is built on prior knowledge. Reflection and problem-solving strategies (e.g., use of reflective open-ended questions, discussing possible solutions to challenging situations based on what has been previously tried) were used during the training course to help participants examine their current practices and beliefs and extend what they know. The trainer also modeled how to use similar strategies with caregivers to help caregivers recognize what they know and build on what they have tried with their children to positively change development. 3) Adults learn best through active participation and practice. In their meta analysis of adult learning methods and effects on learner outcomes, Trivette et al. (2009) reported that the most influential element in the learning process was active learner participation. Participants completing this multi-component, technology-mediated inservice training course were actively involved in learning using a variety of interactional methods, such as discussion, web chat, practicing using what they are learning, and engaging in active reflection and selfassessment between and during training sessions. They also learned how to conduct EI visits that offer caregivers ample and sufficient opportunities to practice using intervention strategies with their children during visits to prepare them to use the same strategies between visits.

4) Adults learn and remember best when what they are learning is practiced in context and in real time. Practicing in context allows the training participant to immediately apply learning, adapt it to his or her unique situation, and integrate it into his or her practices. Throughout this multi-component, technology-mediated inservice training course, participants were instructed to practice using trained strategies during their scheduled intervention visits and reflect on those experiences during the embedded support sessions. Participants also learned about the importance of joining families in their daily routines so caregivers can also practice using intervention strategies during their routines when the strategies are needed.

5) Adult learners want feedback on their learning and their performance. Providing opportunities for caregivers to receive feedback, problem-solve, and reflect on their performance are underused practices during EI visits (Barton & Fettig, 2013; Salisbury et al., 2012). Feedback helps adult learners reflect on their actions and problem-solve ways to improve their performance to achieve their goals. This inservice training course was designed to help participants understand the importance of reciprocal feedback and how to build it into each visit. Participants also received and responded to feedback as part of the embedded support, which was expected to facilitate their learning of the training content.

Applying adult learning theory to *both* the delivery of the multi-component, technologymediated inservice training course and the training content itself aligns well with both the professional development and EI service delivery literature. Professional development that actively engages adult learners in practice, reflection, and feedback opportunities appears to be associated with better learning outcomes (Church et al., 2010; Dunst et al., 2011; Maturana & Woods, 2012; Penuel et al., 2007; Snyder et al., 2011; Trivette et al., 2009). Similarly, it appears that families who are more actively engaged in similar opportunities during visits reap greater benefits from intervention and are able to provide supports for their children between EI visits (Trivette, Dunst, & Hamby, 2010). Further research on the application of adult learning during EI is needed and the proposed research aimed to address that need using an implementation science framework.

### **Implementation Science**

According to Dunst et al. (2013), an implementation science framework can be used to monitor the fidelity of two types of practices associated with both professional development and the application of learning. *Implementation fidelity* refers to how well evidence-based professional development practices are used to promote the adoption of evidence-based intervention practices. *Intervention fidelity* refers to the degree to which evidence-based intervention practices are used as intended by either service providers or caregivers to affect positive outcomes. Both types of fidelity appear to be important for creating the most positive results for children and families (Barton & Fettig, 2013). During this research, fidelity was monitored by using checklists to evaluate the training, the application of the five adult learning

principles and associated EI adult learning strategies participants acquired during the training, and the use of these strategies during their interactions with caregivers and children.

## **Rationale for Proposed Research**

Historically, EI services have focused on the provision of child-centered intervention to infants and toddlers with developmental delays or disabilities. Service providers, such as early childhood special educators, physical therapists, occupational therapists, and speech-language pathologists, worked mainly with the child during intervention visits in the family's home. According to a seminal study by McBride and Peterson (1997), parents were often observed to be passive observers during visits. Little time was spent actively helping parents learn how to use intervention strategies with their children because the focus of intervention was on what the provider could teach the child.

Over the past 20 years, research into evidence-based practices has guided the EI field toward more family-centered, active, capacity-building intervention approaches (Bruder, 2010). That shift represents a focus that is significantly different from how many service providers were trained at the preservice level (Kyzar et al., 2014). Providers are now required to move from conducting child-focused services to facilitating family-centered intervention that supports a child's development in the context of engaging caregiver-child interactions during family activities (McWilliam, 2010). Making this shift requires service providers to engage both the child and adult learners, thereby reducing the amount of time the caregiver spends passively observing interactions during intervention visits (Salisbury & Cushing, 2013; Woods et al., 2011). With the support of the EI service provider, parents and other caregivers become active participants, engaging their children while practicing the use of intervention strategies during visits. To accomplish this, service providers must become more knowledgeable and skilled at supporting adult (caregiver) learning in order to enhance the caregiver's capacity to use intervention strategies with the child in the context of family life (Dunst et al., 2014; Rush & Shelden, 2011; Salisbury & Cushing, 2013; Woods & Brown, 2011).

For this dissertation research project, a multi-component, technology-mediated inservice training course was taught using content that focused on the application of adult learning theory to EI service delivery. It was anticipated that teaching adult learning theory to EI service providers and helping them apply it to their work would positively impact their abilities to support caregivers during EI visits. Similarly, adult learning theory was also used to design and deliver the training course. This combination of applying adult learning theory both to the content taught during the inservice training course and the methods used to deliver the training may better prepare service providers for supporting caregiver learning in EI. With this in mind, this research examined the effects of completion of a multi-component, technology-mediated inservice training course with embedded support, including performance feedback, and a single follow-up interview on inservice EI service providers' abilities to implement family-centered EI adult learning strategies that facilitate adult learning during intervention visits with families of infants and toddlers with developmental delays and disabilities.

#### **Purpose Statement**

This case study research project had the following three specific purposes:

 Practice. Examine the effects of completion of a 6-week, multi-component technologymediated inservice training course and a single follow-up interview on the application of adult learning principles in EI on the frequency of inservice EI service providers' usage of four EI adult learning strategies (e.g., reflective conversation, caregiver practice with feedback, collaborative problem-solving, and joint planning) to enhance caregiver learning during EI visits. (See Tables 1-6 for an overview of the technology-mediated inservice training course content. See Table 17 in Chapter 3 for operational definitions of the EI adult learning strategies that will be taught.)

- 2. Knowledge Acquisition. Examine the effects of completion of a 6-week multicomponent, technology-mediated inservice training course and a single follow-up interview on the application of adult learning principles in EI on inservice EI service providers' knowledge of adult learning and how to apply associated EI adult learning strategies during EI visits.
- 3. **Participant Perceptions of Training Effectiveness.** Determine perceptions of service providers about the effectiveness of a multi-component professional development opportunity using a technology-mediated inservice training course with embedded support and one follow-up interview on the development of their knowledge of adult learning and the application of associated EI adult learning strategies during EI visits.

### **Research Questions**

The following research questions guided the project:

1. **Practice.** Does completion of a 6-week multi-component, technology-mediated inservice training course (which includes three interactive webinars, each 1.5 hours in length, on applying adult learning principles during EI visits with caregivers of young children with disabilities, ages birth to 36 months, and three embedded support sessions, each 1.5 hours in length) and a single follow-up interview increase the usage of four EI adult learning strategies (e.g., reflective conversation, caregiver practice with feedback, collaborative problem-solving, and joint planning) by 10 inservice EI service providers, as measured by 45 minute pre- and post-training video recordings of intervention visits?

- 2. **Knowledge Acquisition.** Does completion of a 6-week multi-component, technologymediated inservice training course on applying adult learning to EI increase inservice EI service providers' knowledge of five adult learning principles and how to apply associated EI adult learning strategies during visits with families, as measured by a 20question pre-posttest knowledge measure? (See Appendix A.)
- 3. **Participant Perceptions of Training Effectiveness.** What perceptions do inservice EI service providers have about the effectiveness of a multi-component, technology-mediated inservice training course which includes embedded support on their knowledge of adult learning and their abilities to foster caregiver learning during intervention visits, as measured by an investigator-developed, 12-item social validity survey, one follow-up interview with each provider two weeks following the completion of the training, and comparisons of initial and final self-assessments by participants? (See Appendices B, C, and D.)

## **Hypothesis**

Based on the above purposes of this project and the research questions, the following three hypotheses were tested:

- Practice. Completion of a 6-week multi-component, technology-mediated inservice training course and a single follow-up interview will increase the use of four EI adult learning strategies by 10 inservice EI service providers, when 45 minute pre- and posttraining coded video recordings of intervention sessions with families are compared.
- Knowledge Acquisition. Completion of a 6-week multi-component, technologymediated inservice training course on applying adult learning to EI will increase inservice EI service providers' knowledge of five adult learning principles and their application of

associated EI adult learning strategies during visits with families, as measured when results of a 20-question pre-posttest knowledge measure are compared.

3. **Participant Perceptions of Training Effectiveness.** Inservice EI service providers will perceive the multi-component, technology-mediated inservice training course which includes embedded support as an effective means of developing their knowledge of adult learning principles and their ability to foster caregiver learning with the use of four EI adult learning strategies during intervention visits, as measured when the results of an investigator-developed, 12-item social validity survey, one follow-up interview per participant two weeks post-training, and initial and final self-assessments by participants are compared.

## **Educational Significance**

There is a substantial need to identify professional development methods that are effective in developing EI service providers' abilities to facilitate caregiver learning during intervention visits so caregivers are confident and competent with supporting their child's development between visits, when the professional is not present (Maturana & Woods, 2012). Workshops have been reported to generally be an ineffective means of changing practices, yet they persist as the most popular means of training service providers and the preferred means for providers to receive information (Bruder et al., 2013; Dunst, 2015; Snyder et al., 2011). The use of the workshop as a means of professional development likely persists because it is a relatively inexpensive training option and requires a limited amount of time and staffing to plan and conduct. Service providers may also prefer this type of learning because it has been the norm for the field for many years.

This research project investigated the usefulness of an alternative to one-shot, face-toface workshops. The multi-component, technology-mediated inservice training course that was conducted for this research project used evidence-based professional development practices (Dunst, 2015; National Professional Development Center on Inclusion, 2008; Snyder et al., 2012), as a means of increasing its utility. The findings of this research inform the field about a new method of professional development that can enhance the implementation of evidence-based intervention practices. This new training course was designed to be easily accessible to service providers in a technology-mediated format, while being offered in a brief, cost-effective manner for professional development providers who are often limited in the scope of training they can provide by the realities of budgeting and staffing issues.

## **Threats to Internal and External Validity**

Because of the nature of this research project, there are several threats to internal and external validity that must be addressed. Possible threats to internal validity include history, testing, and instrumentation effects. As a within subjects pre-post design, it is possible that differences found on the measures for changes in knowledge and frequency of use of strategies could be due to some other event that occurred during the 6-week time period of the training. To control for these possible history effects, each participant was asked to record their one pre- and one posttest video sessions with the same family. Testing effects are also possible because participants took a pretest and posttest knowledge measure and completed a pre- and post-training video recording. It is possible that the results of the posttest knowledge measure and then undergoing training. To reduce the possibility of testing effects, pretest measures were collected before and posttest measures after the 6-week period of time. Instrumentation effects are also a

possibility due to the pre-posttest design and were controlled for by using online survey software to administer the pre-posttest, thereby ensuring that all participants received consistent instructions and a consistent form of the test across both testing opportunities.

Several threats must be acknowledged related to the selection of participants and families who participated in the video recordings provided by the participants. Service provider participants came from a convenience sample of those who choose to participate in the training and in the study. Participants selected the families with whom they collaborated during the training from among the families assigned to their caseloads. Participants also chose which preand post-training videos to submit. It is possible that participants who engaged in these activities and completed the requirements may have different knowledge or experiences as compared to those who did not participate or complete these activities. Families who consented to being recorded could also be different from other families who did not agree to be recorded.

Several characteristics of the research design are associated with threats to external validity. Trivette et al. (2009) suggests that training smaller groups of adult learners may be more effective when changing practices is the intended outcome of training. The sample size of participants in this study was intentionally kept small to align with that recommendation and to better manage the training course activities. However, a small sample also limits the external validity of the findings. While participants did reside in different parts of the Commonwealth, it may still be difficult to generalize findings to the larger population of service providers across the Commonwealth or outside of Virginia. Every effort was made attract participants from across the Commonwealth, including those from diverse educational backgrounds and professional disciplines (e.g., early childhood special education, speech language pathology, occupational therapy, and physical therapy) representing those most commonly identified among staff of EI

programs. The inservice training course was advertised using multiple electronic methods, including a listserv designed to reach all certified inservice EI service providers in the Commonwealth to ensure that registration information was distributed equally across current practitioners. Although some threats to internal and external validity are unavoidable, this study was designed to appropriately manage these threats and address the significant need for accessible and replicable inservice EI training.

## **Organization of Chapters**

To address the stated problem and research questions, the design of the research project is further outlined in the following chapters. Chapter 2 will provide a review of the literature to examine the current status of technology-mediated, inservice professional development in EI, which will be used to guide the development and implementation of the training methods and analysis of data collected before, during, and after the proposed training. That review will build the case for the need for the proposed study. A description of the methods for conducting the training course and collecting data about its effectiveness are described in Chapter 3. Chapter 4 provides an analysis of data and presentation of the results, and Chapter 5 includes a discussion of findings, their implications for the professional development of EI service providers, and recommendations for future research.

### **CHAPTER 2**

## LITERATURE REVIEW

#### **Chapter Overview**

In order to have highly qualified service providers in the early intervention (EI) system, inservice training is needed that is easily accessible and grounded in evidence-based professional development and adult learning practices. The proposed research project addresses this need through the development, presentation, and evaluation of a multi-component, technologymediated inservice training course for EI service providers who are currently supporting infants, toddlers and their families in the Infant and Toddler Connection of Virginia's EI system. This chapter will review current literature on technology-mediated professional development activities which have been reported in the EI literature since 2005. The participants in the professional development activities reflected in this literature, the content addressed, and the methods used to provide professional development will be compared across studies to examine what is currently known about technology-mediated inservice training for EI service providers. Effectiveness of these activities will be examined, and all studies will be compared against Dunst's (2015) seven key features of evidence-informed inservice professional development model to identify any gaps in recent training offerings that could affect the quality of learning for participants. This information will inform the need for the multi-component, technologymediated inservice training course described in this research project. This literature review will also inform the design of the training course, which included a series of interactive webinar sessions and embedded support sessions, brief assignments, self-reflection activities, and a follow-up interview.

## Introduction

Part C of the Individuals with Disabilities Education Act (2004) states that programs receiving federal funding for early intervention (EI) services must coordinate a comprehensive system of personnel development (CSPD) for the practitioners who deliver these services (IDEA, 2004, §303.118). EI services are provided to eligible infants and toddlers (ages birth to 36 months) who have developmental delays and/or disabilities, and their families. The providers of the most common EI services include professionals from a variety of disciplines, such as education, physical therapy, occupational therapy, and speech-language pathology (Hebbeler et al., 2007). In addition to EI service providers, states' CSPDs must also address professional development needs for service coordinators, who are responsible for coordinating the delivery of the services indicated on a child's Individualized Family Service Plan (IFSP). Despite this federal requirement for a CSPD, challenges have persisted with providing adequate and effective professional development to practitioners in the EI field (Bruder, 2010).

According to Bruder (2010), providing effective professional development to EI practitioners is a significant challenge for CSPDs across the United States. Little guidance is provided in the federal law regarding requirements for a CSPD, resulting in a great deal of variation in how CSPDs are organized and operated. A survey of state-level Part C EI program coordinators and coordinators of early childhood special education programs revealed that less than half of survey respondents reported that personnel were adequately trained (Bruder, Mongro-Wilson, Stayton, & Dietrich, 2009). Of Part C program coordinators participating in the survey, only 76% reported having an in-service training program that met the survey definition of being both "systematic and sustainable" (Bruder et al., 2009, p. 15). The most frequent methods of delivering training to EI practitioners reported by survey respondents included face-

to-face or web-based trainings, presentations, and conferences – all "one-shot" trainings without follow-up, which are widely recognized as ineffective methods of professional development when changing professional practices is the goal (Bruder, Dunst, Wilson, & Stayton, 2013; Cook & Odom, 2013; Church, Bland, & Church, 2010; Dunst, Trivette, & Deal, 2011; Joyce & Showers, 2002; Odom, 2009). This finding was reiterated by Snyder, Hemmeter, and McLaughlin (2011), who described the methods used to train providers of early childhood intervention as primarily "one-shot workshops or episodic trainings unconnected to practitioners" day-to-day work" (p. 368). Snyder et al. called for a commitment from the EI field to move away from these ineffective training methods, and toward more enlightened professional development that is grounded in the emerging evidence base describing the process components necessary for successful learning and practice.

Odom (2009) described early childhood professional development as a "wired" topic, meaning that effective training is a growing focus in the field as it relates to the implementation of evidence-based practices. Odom described "enlightened professional development" as emphasizing training methods that go beyond the single workshop to support practitioners' sustained use of evidence-based practices with children and families. These ongoing methods of training included coaching and consultation, which refer to the use of an outside consultant or coach who facilitates learning by observing practices, demonstrating their use, facilitating the learner's reflection and self-assessment, and providing feedback, typically following a workshop-style event. While coaching and consultation as training methods have been discussed in the special education and general education literature for some time (Church et al., 2010; Joyce & Showers, 2002; National Professional Development Center on Inclusion, 2008), these methods have only recently been examined in the EI literature as a means of providing professional development. Similarly, technology-mediated professional development is also emerging in the EI field and was described by Odom (2009) as a promising method that warranted additional research. Technology-mediated professional development methods include (but are not limited to) online instruction via modules or courses, instructional websites (i.e., sites designed to support professional development and collaboration, such as wikis or other resource-based sites), webinars (i.e., web-based seminars or training sessions), web-based videos, and video-, web- or tele-conferencing. These methods have the potential to reduce training costs and make learning opportunities more widely available. Subsequently, many states' CSPDs are currently developing technology-mediated professional development activities. The challenge before states, though, is finding cost-effective and manageable methods of delivering training that addresses and maintains the implementation of evidence-based intervention practices by practitioners, while also using evidence-based professional development methods to design, facilitate, and maintain ongoing and accessible professional learning.

## **Definition and Components of Effective Professional Development**

In 2008, the National Professional Center on Inclusion (NPDCI) proposed a definition for professional development for early childhood providers with the intention of providing guidance toward the use of more effective, evidence-based training methods. This definition has become widely used and described professional development as:

"...facilitated teaching and learning experiences that are transactional and designed to support the acquisition of professional knowledge, skills, and dispositions as well as the application of this knowledge in practice" (p 3).

The NPDCI definition continued with a description of three core components of professional development: 1) the "who" or the learners, 2) the "what" or the training content, and 3) the "how" or the delivery of the learning experience. Specifically, the "who" component referred to the characteristics of the learners who will receive PD and the contexts in which they will use what they learn. The "what" component described the information being taught, including knowledge, skills, and professional practices. In a more broad sense, the "what" also addressed the evidence base for the practice being taught, what it looks like in real-world contexts, its purpose, and how it fits with accepted standards. The "how" component referred to the methods used to facilitate learning and how these methods were organized.

Within the "how" component, NPDCI (2008) identified three empirically-based elements associated with effective professional development. To be effective, instruction should focus on *practices* (rather than more general content) and be specific to the situations in which the practices will be used. Professional development should be aligned with professional goals, standards, and the actual practices used by learners, which may help practitioners be more successful in applying what they learn. Professional development should also be "intense, sustained over time, and include guidance and feedback on how to apply specific practices through methods such as coaching, consultation, or facilitated collaboration (i.e., communities of practice, teacher study groups)" (NPDCI, 2008, p. 4). This recommendation that professional development occur over time (rather than as a single workshop) and with ongoing support in order to help learners integrate their new knowledge in practice has also been supported in the K-12 general education (Church et al., 2010, Penuel, Fishman, Yamaguchi, & Gallagher, 2007), technical education (Hobbs, Foster, Pritz, & Kelley, 2011), and special education literatures (Cook & Odom, 2013; Kretlow & Bartholomew, 2010; Kretlow, Cooke, & Wood, 2012).

Additional research is needed that describes this 'how" component in detail, specifically outlining how effective professional development is delivered to inservice professionals over time and with ongoing support (Cook & Odom, 2013; Snyder et al., 2011).

## **Delivery of Effective Professional Development in Early Intervention**

Building on NPDCI's work and other research on supporting adult learning (Trivette, Dunst, Hamby, & O'Herin, 2009), Dunst (2015) outlined a model for in-service professional development that includes seven key features important to the delivery of training. These key features describe evidence-based activities that are critical to supporting adult learners in understanding and adopting new practices. This model is unique in that it extended beyond the effects on practitioner practices, to the end goal of EI, which is achieving positive outcomes for children and their families through multi-component professional development. A description of each of the seven key features described by Dunst (2015) follows:

1) Explanation and illustration. According to Dunst (2015), professional development methods must be used that introduce the practice and its key characteristics to learners. The use of the practice and its intended effects on either the child or the adult who is a caregiver for a child must also be demonstrated or illustrated and compared to established professional standards.

2) Job-embedded opportunities. Learners benefit from active and repeated opportunities to use a practice in real-world contexts that mimic how they will be used on the job. These opportunities include actual practice during intervention visits (or in classroom settings, depending the practitioner's role), descriptions of the use of the practice, and simulated opportunities such as role play or reviewing case studies. These practice opportunities must also include self-evaluation in order for learners to reflect on their learning and use of the practice.

#### 3) Use of different types of PD practices for learner engagement and reflection.

Providers of PD should offer opportunities that engage learners in reflecting on their understanding and mastery, such as performance-based discussions and reflective conversations, journaling, and self-assessment using performance-based checklists. These opportunities should facilitate learner reflection on what went well and where improvement is needed which may enhance learner skills and knowledge.

4) Use of coaching, mentoring, or performance feedback. Dunst (2015) recommended that ongoing, performance-based support be provided during in-service training using methods such as direct observation of learners using practices, reflection on videos that show the learner applying what was learned, or providing ongoing support via other methods of communication such as phone, email, or web-based interactions. The purpose of coaching, mentoring, or performance feedback is to actively support the learner in reflecting on his or her mastery and ability to integrate what was learned into actual practice.

**5) Ongoing follow-up.** Ongoing follow-up was described as most effective when it occurs as a support across time that promotes the adoption of a practice (Dunst, 2015). This follow-up could be delivered by trainers, peers, coaches, supervisors, or others, but is most likely to be effective when it is job-embedded.

6) Sufficient duration and intensity with multiple opportunities to practice. Dunst (2015) suggested that professional development will be most effective when multiple opportunities are provided for learners to interact with trainers and use what they learn.

7) Includes all or most of these six key features. Based on previous research (Dunst & Raab, 2010; Dunst & Trivette, 2009; Dunst et al., 2011; Trivette et al., 2009; Trivette, Raab, & Dunst, 2012), Dunst (2015) recommended that professional development include all or most of

these six key features, which he reported will make training more likely to be effective. He stated: "results indicate that the more hours of job-embedded authentic learning opportunities are provided to a small number of practitioners, the larger are the effects of in-service professional development" (p. 214).

Dunst (2015) also noted that this model could be used as a guide in the development and delivery of in-service professional development for early childhood practitioners, including early interventionists. Dunst and his colleagues have applied the principles used to develop this model (but not the complete model itself) in several empirical studies of in-service training using the Participatory Adult Learning Strategy (PALS) approach for early interventionists and Head Start teachers with successful training outcomes (Dunst & Raab, 2010; Dunst & Trivette, 2009; Raab, Dunst, & Trivette, 2010; Trivette et al., 2009; Trivette et al., 2012). Though grounded in empirical research, Dunst's model has yet to be applied and examined in EI or professional development research to date due to its recent publication. However, this model, along with the process components for professional development described by NPDCI (2008), could be used to examine the current status of training within the EI field. More specifically, and in alignment with Odom's (2009) suggestion that enlightened professional development includes methods supported by technology, this model could be used to examine a subset of training efforts that are emerging as a method of delivering training by states' CSPDs: technology-mediated professional development. Examining recent technology-mediated professional development efforts and their alignment with what is known about how to deliver effective training may inform employees of states' CSPDs, university faculty, and leaders in state and local EI programs, about how to shift training resources (e.g., funding and manpower) toward other methods that may also make professional development more widely available to practitioners. Identifying what has been

done, the strengths and weaknesses of technology-mediated professional development currently used in the field, and important implications for the provision of training in the future may also help states' CSPDs make better use of the limited resources available to support ongoing professional learning among EI practitioners.

This literature review was conducted to examine the current status of technologymediated professional development provided to EI practitioners since 2005. It was guided by the following questions:

1) What is the current status of technology-mediated professional development provided to EI practitioners in terms of the NPDCI process components of who it has been provided to, what training content has been the focus, and how that content has been delivered?

2) What effect has the delivery of technology-mediated professional development to EI practitioners had on learner outcomes within the past 10 years?

3) Which key features of evidence-based in-service professional development, specifically related to ongoing support, were present in the technology-mediated professional development delivered to EI practitioners within the past 10 years?

## Methods

Studies investigating professional development for EI practitioners that included technology-mediated components were the focus on this review. Peer-reviewed literature published from 2005-2015 was searched in order to identify articles describing the current status of technology-mediated professional development for this population. Searches were conducted using three methods. First, databases were searched using the following search terms: *early intervention, early childhood intervention, professional development, in-service, web-based,* 

*online, technology-mediated, distance education, technology, training, workshop(s).* These terms were used to search ERIC (Education Research Information Center), Education Research Complete, Education Source, Social Sciences Index – Web of Science, and PsycInfo databases. These searches were supplemented with a Google Scholar search. Tables of content from the three leading journals in the fields of EI and ECSE were searched: *Infants & Young Children, Journal of Early Intervention,* and *Topics in Early Childhood Special Education.* The aim of this search was to identify articles missed from the database searches. Finally, an archival review of reference lists was conducted from sources identified during the previous searches to identify any additional studies.

Studies were included in this review if they met the following criteria related to participants, technology-mediated components, and level of detail. Participants included EI practitioners who worked with families of infants and toddlers (ages birth to 36 months) who were at-risk for or who demonstrated developmental delays and/or disabilities. These practitioners were employed as service providers (i.e., educators, physical therapists, occupational therapists, speech-language pathologists, nurses, and home visitors), service coordinators, and administrators and had been involved in inservice training activities. Studies were included if they described a professional development activity with at least one technologymediated component designed to support distance learning (e.g., teleconferencing, web conferencing, online modules). The authors of the included studies also provided enough detail to determine the process components of the professional development activity, in terms of who received training, what content was taught, and how training was delivered.

Studies were excluded if the audience did not include EI practitioners currently working in programs supporting infants and toddlers who were at-risk of or who had developmental delays and/or disabilities, if the professional development activity did not include a technologymediated component, and if insufficient information was provided about the "who, what, and how" process components of the professional development activity. Studies that included little information about the ages of the children served by study participants were excluded because it was impossible to determine that the author's use of the term *early intervention* referred to intervention with the 0-3 population. Articles were also excluded if they were non-empirical, describing a professional development activity without any measure of its effectiveness.

Based on these criteria, nine studies published from 2008-2014 were reviewed and are included in Table 7.

## Table 7

# Studies Analyzed in Review

Author(s)	Year	Title
Behl, Houston, & Stredler- Brown	2012	The value of a learning community to support telepractice for infants and toddlers with hearing loss
Brown & Woods	2012	Evaluation of a multicomponent online communication professional development program for early interventionists
Buzhardt, Greenwood, Walker, Anderson, Howard, & Carta	2011	Effects of web-based support on Early Head Start home visitors' use of evidence-based intervention decision making and growth in children's expressive communication
Chen, Klein, & Minor	2008	Online professional development for early interventionists: Learning a systematic approach to promote caregiver interactions with infants who have multiple disabilities
Chen, Klein, & Minor	2009	Interdisciplinary perspectives in early intervention: Professional development in multiple disabilities through distance education
Kyzar, Chiu, Kemp, Aldersey, Turnbull, & Lindeman	2014	Feasibility of an online professional development program for early intervention practitioners
Maturana & Woods	2012	Technology-supported performance-based feedback for early intervention home visiting
Ridgley, Snyder, McWilliam, & Davis	2011	Development and initial validation of a professional development intervention to enhance the quality of individualized family service plans
Vismara, Young, Stahmer, Griffith, & Rogers	2009	Dissemination of evidence-based practices: Can we train therapists from a distance?

## Findings

Each study was reviewed and coded according to the NPDCI (2008) core components of "who, what, and how" to determine the process components of the professional development activity described by the authors. To determine who participated in professional development, descriptive information was coded according to the number of participants receiving training, gender, ethnicity, discipline or profession, years of EI experience, and educational level (see Table 8). These categories were used for coding because they represented the most frequently reported demographic information in the EI literature. To examine patterns across training content (the "what" component), studies were coded according to the use of specific training curricula or programs and the topic of PD (see Table 9). The "how" or delivery of professional development, was coded according to the elements used to deliver training (i.e., technologymediated or in-person elements) and the learning materials or objects provided to learners by the facilitators of the training activities (see Table 10). Finally, using the categories identified to describe the delivery of professional development across studies, learning outcomes and participant satisfaction (when measured) were also coded to determine the effectiveness of the trainings described in the studies. Study outcomes and effectiveness will be analyzed after findings across NPDCI components are described. A comprehensive analysis of the NPDCI process components of technology-mediated, in-service professional development, as reported in the EI literature since 2005, will be reviewed next.

# Table 8

# Who: Participants in Reviewed Studies

Citation	Number of participants	Gender	Ethnicity	Discipline or profession	Years of experience in EI	Educational level
Behl et al. (2012)	15					
Brown & Woods (2012)	24	Female (100%)	Caucasian (100%)	Special instructors: Educators (95.8%) Therapists (4.2%)	6.49 years (mean)	Master's or Specialist's (29%) Bachelor's (71%)
Buzhardt et al. (2011)	48	Female (100%)		Home visitors (100%)		Master's (2%) Bachelor's (22%) Associate's (32%) No degree (41%) Other (2%)
Chen et al. (2008)	86			Educators (51%) Therapists (28%) Other (21%)	1.28 (mean)	
Chen et al. (2009)	110			Educators (52.2%) Therapists (22.5%) Other (25.2%)		
Kyzar et al. (2014)	40	Female (97.5%)	White, Non- Hispanic (97.5%)	Educators (45%) Therapists (42.5%) Other (12.5%)	More than 11 years (47.5%) 6-10 years (25%)	

Table 8 Continued

Citation	Number of participants	Gender	Ethnicity	Discipline or profession	Years of experience in EI	Educational level
					Less than 5 years (27.5%)	
Maturana & Woods (2012)	18	Female (94%)	Caucasian (94%)	Educators (45%) Early childhood developmental specialists (11%) Therapists (38%) Other (12%)	1 year (average)	Master's or Specialist's (67%) Bachelor's (33%)
Ridgley et al. (2011)	10			Service coordinators (80%) Administrators (20%)		
Vismara et al. (2009)	10			Educators (10%) Therapists (30%) Case managers (20%) Other (40%)	3 years or less (70%) 10-13 years (20%) 30 years (10%)	Master's or Doctorate (80%) Bachelor's (20%)

*Note:* "Other" includes disciplines or professions such as nursing, social work, psychology, child development, autism and behavior specialists, and program directors.

# Table 9

# What: Focus of Professional Development Content

Study citation	Training curricula/program	Topic of professional development	
Behl et al. (2012)		Support the use of telepractice in the delivery of EI services infants and toddlers with hearing loss and their families	
Brown & Woods (2012)	Family-Guided Routines-Based Intervention (FGRBI)	Facilitate communication development and intervention using caregiver coaching strategies	
Buzhardt et al. (2011)		Support data-based decision-making when identifying intervention strategies to address communication development using the Early Communicator Indicator (ECI) assessment tool	
Chen et al. (2008)	Promoting Learning through Interaction (PLAI)	Implement intervention strategies with caregivers to promote interactions with their infants with multiple disabilities	
Chen et al. (2009)		Implement intervention strategies with families of children with multiple disabilities to address developmental needs	
Kyzar et al. (2014)	Early Years	Implement evidence-based EI practices in natural environments with diverse families	
Maturana & Woods (2012)	Family-Guided Routines-Based Intervention (FGRBI)	Implement caregiver coaching strategies during EI visits with families	
Ridgley et al. (2011)		Use of Tennessee EI Data System-Plus (TEIDS-Plus) to improve the quality of IFSPs and data-based decision-making	
Vismara et al. (2009)	Early Start Denver Model (ESDM)	ESDM implementation	

## Table 10

Citation	Technology-mediated mechanism(s)	In-person mechanism(s)	Learning materials or objects (provided to learners)	
Behl et al. (2012)	Web-conferencing and teleconferencing for monthly calls	Initial onsite meeting (1.5 days)		
	Moodle workspace			
	Google docs			
Brown & Woods (2012)	Introductory conference call		Unit readings with videos	
	Email communication			
	Five asynchronous web- based content units			
	Review of written and video exhibits submitted by learners			
Buzhardt et al. (2011)	Access to online data system website	Annual training for program staff	Two intervention manuals	
Chen et al. $(2008)$	Asynchronous discussions	Initial orientation	PLAI manual	
(2008)	via course website	Final masting (5	Videos	
		hours)		
Chen et al. (2009)	Nine asynchronous web- based modules	Initial orientation meeting (5 hours)	Electronic text (CD- ROM with text, graphics, and videos)	
	Course website (i.e., asynchronous threaded discussions, synchronous online discussions, quizzes)	Final debriefing meeting (5 hours)	Scapines, and (10005)	

How: Type of Professional Development and Mechanisms of Training Delivery

## Table 10 Continued

Citation	Technology-mediated mechanism(s)	In-person mechanism(s)	Learning materials or objects (provided to learners)
	Video conferencing for small group meetings		
Kyzar et al. (2014)	Four asynchronous web- based modules	Onsite mentor coaching (1-hour, weekly sessions)	Multi-media demonstrations (i.e., video, audio, photo)
			Mentoring tools: <i>Mentor Coaching</i> <i>Guidebook</i> and <i>Early</i> <i>Years Conversation</i> <i>Guide</i>
Maturana & Woods (2012)	Expert mentoring via Skype, teleconferencing, email, and Voicethread	Three workshops	
		Peer mentoring	
	Review of videos submitted by learners with performance feedback		
Ridgley et al. (2011)	TIEDS online data system Project website	Workshop (3 days)	Digital learning objects embedded in TIEDS-Plus system (i.e., text prompts, fields on page, web links, forms, written summaries and examples, fidelity checklists, list of additional resources)
Vismara et al. (2009)	Teleconferencing for participation in seminar and team supervision	Seminar (13 hours)	Self-instruction via DVD including a manual, curriculum and fidelity checklists, and video examples

### **Process Components of Technology-Mediated In-Service Professional Development**

Who: Participants. The nine studies included in this review targeted professional development efforts to a variety of EI practitioners. Seven studies including practitioners working in Part C EI programs. Participants from one study were employed by a specialized program providing listening and spoken language communication support to infants and toddlers with hearing loss, including practitioners in a Part C program. The final study included participants from an Early Head Start program. Sample sizes in these studies ranged from 8-86 practitioner participants. Across all studies, participants were self-selected, either by the participant as a volunteer attendee or by local EI program administrators who recruited staff to participate. In studies which included information about practitioner discipline or profession, similarities were noted. Most frequently reported practitioner disciplines included education (e.g., early childhood education, early childhood special education, severe disabilities), therapy (e.g., physical therapy, occupational therapy, and speech-language pathology), and other disciplines such as nursing, social work, psychology, and child development. Professions included special instructors, home visitors, service coordinators, autism and behavior specialists, administrators, and program supervisors. Participants in the four studies reporting on gender were predominately white females. Most participants who received training in five of the studies reporting years of experience had less than seven years of experience providing EI services. Of the seven studies that reported educational level, participants in six studies had a minimum of a Bachelor's degree, with many holding advanced degrees. One study reported that most participants had some early childhood training but no degree or had an associate's degree (Buzhardt et al., 2011). Table 8 includes information about each study's participant sample.

What: Content of professional development. The training content for five of the reviewed studies focused on teaching service providers to implement specific EI strategies based on established curricula, programs or models of intervention. Kyzar et al. (2014) used the Early Years professional development program to prepare 40 service providers to work with diverse families while using evidence-based, natural environment practices. This program was used to instruct providers in how to establish trusting partnerships with families in order to support their active decision-making during the EI process. The topics trained included empathetic communication, evidence-based practices, service coordination, and implementation of EI services in natural environments. Similarly, Brown and Woods (2012) and Maturana and Woods (2012) also addressed the implementation of service in natural environments, but focused on the use of coaching strategies to support caregiver learning during EI visits. In both studies, specific caregiver coaching strategies (e.g., direct teaching, conversation and information sharing, demonstration, observation, guided or caregiver practice with feedback, problem-solving, reflection, and joint interaction) from the Family Guided Routines-Based Intervention (FGRBI) model were taught to EI providers. The FGRBI model is a family-centered approach to EI that promotes the use of evidence-based caregiver coaching strategies by service providers within the context of everyday family routines as a means of influencing a child's development. Brown and Woods (2012) designed their Communication Coach course to address four areas of content which are included in the FGRBI model: 1) communication development; 2) child learning during everyday activities; 3) team collaboration; and 4) supporting families to provide intervention during daily routines. Maturana and Woods (2012) evaluated an ongoing project in one state in which the authors were contracted to increase the use of the FGRBI model. They addressed caregiver coaching strategies as well as specific routines in which the model could be

implemented, such as during play, caregiving, pre-academic and literacy, and family or community routines. Training content for all three of these studies was described in detail and focused on EI strategies that could be used to support a broad array of families, regardless of the child's diagnosis or level of qualifying developmental delay.

Two of the five studies that evaluated professional development using pre-designed curricula or programs focused on intervention techniques to support specific populations of children such as children with autism spectrum disorder (ASD) or multiple disabilities. Vismara, Young, Stahmer, Griffith, and Rogers (2009) described training aimed at teaching EI therapists to use the Early Start Denver Model (ESDM) during one-on-one therapy with young children with ASD. The ESDM is an evidence-based intervention model designed to be used by homebased therapists and parents to promote cognitive, social-emotional, and language development during daily routines and playful interactions (UC Davis Mind Institute, 2015). The evidencebased content taught to participants was drawn from other models including the Denver Model (Rogers et al., 2006) and Pivotal Response Training (Koegel & LaZebnik, 2004). Further details describing specifically what was taught to participants were not provided by the authors, who instead cited other literature describing these models. In contrast, Chen, Klein, and Minor (2008) outlined course content in their study using the Promoting Learning through Active Interaction (PLAI): A Guide to Early Communication with Young Children who have Multiple Disabilities (Klein, Chen, & Haney, 2000) curriculum to instruct EI service providers. The PLAI curriculum included five content areas: "1) understanding child cues, 2) identifying child preferences, 3) establishing predictable routines, 4) establishing turn taking, and 5) encouraging communicative initiations" (Chen et al., 2008, p. 123). Each content area included a goal and strategies that EI providers could implement during visits with children and families. Despite the differences in the
level of detail across studies describing training content, both studies were grounded in an established curriculum or model of intervention and appeared to focus on intervention strategies for children with specific needs.

Similarly, Chen, Klein, and Minor (2009) evaluated a professional development opportunity for EI providers who worked with families of children with multiple disabilities. This study did not feature a pre-designed curriculum as its core content; rather, content was specifically developed for an in-service course. The course included nine modules addressing the following topics: "1) working with families, 2) home visiting approaches in EI, 3) early communication development and the role of caregiver-child interactions, 4-5) sensory processing in the context of EI: parts 1 and 2, 6) motor development and physical disabilities, 7) vision development and visual impairment, 8) hearing loss, and 9) infusing interdisciplinary strategies within daily routines" (Chen et al., 2009, p. 148). This course also included information about roles and responsibilities for early childhood special educators and related disciplines (e.g., speech-language pathologists, occupational therapists, physical therapists, teachers certified in visual impairment or hearing loss). Training content appeared to include similar information to what was addressed using the PLAI curriculum by Chen et al. (2008), particularly related to communication development. However, the content in Chen et al. (2009) was of a broader scope, including additional areas of development that did not appear to be included in the PLAI curriculum.

Two studies included instruction about the use of a database system as part of their professional development activities. Similar to Chen et al. (2008, 2009), Buzhardt et al. (2011) also addressed early communication development in their training content. They designed training around instruction in the administration and scoring of an assessment tool, the *Early* 

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*Communicator Indicator* (ECI; Walker & Carta, 2010), which was being used by Early Head Start home visitors in four programs in one state. Training content also addressed how to use a data system website and data-based decision-making to inform communication intervention. Information was provided to help participants determine when a child was not making adequate progress in communication development and what intervention strategies should be used based on the child's status. Home visitors receiving this training had access to two training manuals: the *Strategies for Promoting Communication and Language of Infants and Toddlers Manual* and the *Language Intervention Toolkit*. The professional development activities described by Buzhardt et al. (2011) focused on helping home visitors use information from the ECI assessment and the database to make decisions about how to support infant or toddler communication development during visits with families.

Ridgley, Snyder, McWilliam, and Davis (2011) also provided training related to the use of a database system, but targeted service coordinators as their participants. In this study, professional development activities were designed to facilitate service coordinators' implementation of five components included in the Tennessee Early Intervention Data System (TEIDS-Plus) when developing IFSPs with families. To support the implementation of these five components, the TEIDS-Plus training included education about the learning objects that were integrated into the data system to cue service coordinators about implementation. These five components included: "1) functional assessment, 2) functional outcome writing, 3) linking functional outcomes to service decisions, 4) integrating service delivery, and 5) monitoring progress" (Ridgley et al., 2011, p. 313). Each of these components was described by the authors in detail. The first component focused on teaching service coordinators about gathering functional assessment information from families about their child, their family and the child's functioning in the context of everyday life. The second component integrated recommended practices for writing IFSP outcomes that focused intervention on family priorities for the child's everyday functioning. The third component emphasized that service delivery should be based on which services will help the child achieve the IFSP outcomes with the least intrusion into the family's life. The fourth component focused on the implementation of the IFSP and how services are provided in the family's natural environments using shared responsibility and collaboration among all team members. Progress monitoring, in the fifth component, was described as a data-driven process, based on data gathered during monthly visits that is used to make changes to the IFSP. Both the Buzhardt et al. (2011) and Ridgely et al. (2011) studies targeted data-based decision-making after additional training in the targeted topics of interest.

The final study included in this review had a different audience and specific purpose than any of the other studies. Behl, Houston, and Stredler-Brown (2012) described efforts to foster a learning community for early interventionists who used telepractice to support infants and toddlers with hearing loss and their families. The authors of this study described anticipated outcomes of participation in the learning community including: 1) gaining knowledge of telepractice technologies and their applications, 2) the importance of social interactions within telepractice, 3) key steps involved in telepractice, 4) tools for measuring costs and efficacy, and 5) identification of resources for technical assistance and support. The learning community did not operate within a specific curriculum or set agenda; rather, content topics were identified by participants in the learning community related to the expected outcomes and the delivery of EI services via telepractice.

*Summary of content ("what" component) from reviewed studies.* All studies in this review addressed information related to the implementation of EI services, whether through

teaching specific intervention strategies or more broad approaches to decision-making or service delivery (see Table 9). Most studies focused on instruction related to the implementation of evidence-based or recommended practices with either the wider population of children and families enrolled in EI programs or more specific populations, such as diverse families, children with ASD, or children with multiple disabilities. Among the studies reviewed, descriptions of training content varied from well-described to minimally described, with some studies providing detailed information about what was taught and others focusing less on describing training content (the "what") and more on the delivery of professional development (the "how").

How: Delivery of professional development. The combinations of training formats used to facilitate learning varied across studies. Three studies employed a combination of video or teleconferencing, in-person meeting and/or mentoring. In two studies, participants completed a series of asynchronous online modules and in-person meetings. Two other studies described support provided to participants via website access, an online data system, and in-person meetings. Authors of one study facilitated online discussions as part of a web-based course which also included in-person meetings. Only one study described a technology-mediated professional development activity that included web-based content units, teleconferencing, and email with no in-person component. See Table 10 for information about technology-mediated and in-person components and learning objects included in each study. Each of these studies will be described below according to the methods of delivering professional development.

*Video or teleconferencing, in-person meeting and/or mentoring.* Professional development in three studies was provided using video or teleconferencing for the purpose of supporting application of learning following in-person interactions. Maturana and Woods (2012) conducted a year-long professional development project designed to support EI service providers

with using caregiver coaching strategies during visits with families. Teams of two peer mentors (a total of 18 EI service providers) participated in a multi-component learning process which included three in-person workshops, peer and expert mentoring, video review with performance feedback provided by expert mentors, follow-up feedback after expert mentoring, and monthly email newsletters. Minimal information was provided by the authors regarding the in-person workshops, except for noting that the workshops were designed to teach participants to embed caregiver coaching strategies during intervention provided in the context of family activities. The workshop content was based on the FGRBI approach. Following the workshops, the researchers used what they called a Distance Mentoring Model (DMM) to facilitate ongoing professional development. Participants submitted a monthly video (for eight months) of an intervention visit with a family demonstrating their application of the caregiver coaching strategies learned during the workshop. Expert mentors (the authors of the study) coordinated feedback sessions with some peer mentor teams using the Skype video conferencing service so that the mentor and peers could watch edited clips from each peer's video submission together. Other peer teams engaged with expert mentors using conference calls during which the video session was discussed rather than viewed. Performance-based feedback was provided by the expert mentor, while the peer mentors provided feedback to each other. Feedback was provided on two clips per participant. One clip was of the participant using caregiver coaching and the other clip showed the participant demonstrating a missed opportunity to use the strategies. Feedback sessions typically lasted one hour, included a short PowerPoint slide deck shared via www.voicethread.com, were guided by a fidelity checklist, and included problem-solving, reflection, and planning discussions. Following the feedback sessions, the expert mentor sent an email summary of the feedback session with the video files to the peer mentor teams. The written summary included

goals and plans for the next session. Participants were included in the analysis if they had attended at least two workshops, submitted four videos, participated in four feedback sessions, and maintained contact with one to two families to complete the video recordings.

Like Maturana and Woods (2012), Vismara and colleagues (2009) included video feedback as a component of their professional development activity. These researchers also conducted training followed by "team supervision" during which videos were viewed and discussed with teams of 10 EI therapists. Teams participated in person or via teleconferencing too, in both the training and the supervision components. The activity described by Vismara et al. included three conditions: 1) self-instruction, 2) training seminar, and 3) team supervision. Each of the three conditions occurred over a 5-6 week period, with each period including the specific training activity (e.g., self-instruction, training seminar, or team supervision), followed by time for participants to practice using the Early Start Denver Model (ESDM) during weekly treatment sessions with children and families. Prior to the training seminar and supervision, team participants engaged in self-instruction using a DVD with an instructional manual, curriculum and fidelity checklists, and video examples illustrating techniques from the ESDM. Following the self-instruction period, 10 participants completed a training seminar (13 hours total), with five participants attending in person, and five attending using teleconferencing. Four hours of team supervision occurred following the training seminar to provide teams with opportunities for case discussion. Videos of intervention sessions were submitted by participants prior to receiving any training and at the end of each of the three conditions (e.g., self-instruction, training seminar, and team supervision). Participants submitted self-rated fidelity checklists for each video they submitted, scored data sheets documenting the child's progress based on the recorded sessions, and a self-satisfaction survey. The videos were viewed and discussed and feedback was provided

during a 2-hour technology-mediated supervision meeting with each team, which was conducted by two of the study authors. A final 1-hour conference call was conducted with each team to gather feedback about the project. Vismara et al. also described a second phase of their study, which focused on measuring parent implementation of the ESDM, but that phase will not be discussed in this paper as this review only addresses training for professionals.

The professional development activity described by Behl et al. (2012) targeted 15 EI administrators and service providers from six programs providing services to children who were deaf or hard of hearing. Like Maturana and Woods (2012) and Vismara et al. (2009), this study included an in-person meeting component followed by additional technology-mediated, ongoing support. The initial meeting occurred over  $1\frac{1}{2}$  days and focused on preparing participants to engage in a learning community. During the first day of the meeting, information was provided about the purpose of the learning community, which was to support participants' in using telepractice to provide EI services to families and children with hearing loss. Participants discussed their practices, shared video clips of their own telepractice sessions with families, and explored telepractice equipment. The second day of the meeting allowed participants to determine the direction of the learning community. Participants decided to create a resource guide and discuss evaluating the effectiveness of telepractice. Additional topics were identified and meeting logistics and timeframes were confirmed. Learning community meetings occurred monthly for six months using Adobe Connect web-conferencing software or other teleconferencing methods. Participants accessed an online Moodle workspace and Google Docs to collaborate on product development between calls. Results revealed that at the conclusion of the learning community meetings project, participants had increased their knowledge of

telepractice, developed a logic model for evaluation purposes, and produced a resource guide that included tools to support the use of telepractice as a method of delivering EI services.

These three studies described the delivery of professional development in detail. The authors employed multiple methods to support the application of specific intervention strategies or service delivery methods. Professional development was aligned with professional standards related to two established service delivery approaches (using the FGRBI or the ESDM) and one more generalized service delivery method (telepractice). All three studies delivered training over time, from almost four months to one year. Participants attended in-person workshops or meetings and were expected to be actively engaged afterwards by contributing reflections and videos of practice and collaborating on shared projects. Collaborative, reflective interactions were required in all three studies, with participants engaging in mentoring, team supervision, or regular community of practice style learning community calls, all of which were designed to ensure active, sustained learning as well as reflection for participants.

*Web-based modules and in-person interactions.* To support adult learning, two studies used a combination of in-person interactions and online modules. Kyzar et al. (2014) studied the Early Years professional development program, which was designed to prepare 40 practitioners to work with diverse families using evidence-based EI practices. Training was delivered through two methods: online modules and on-site mentor coaching. Participants completed a series of four modules, each of which included six to eight sessions of approximately one hour each. Each session was described as aligning with adult learning principles because each provided ways for participants to: 1) describe characteristics of evidence-based strategies, 2) watch video illustrations, 3) practice by analyzing one's own ability to implement the strategies, and 4) reflect on the impact of the use of the strategy. The modules addressed an evidence-based decisionmaking framework that participants could use to determine when to use the strategies. One online module about evidence-based practices was described in depth and included content and online resource links, downloadable and printable documents, video and audio clips of families and providers, knowledge checks, reflection questions, and self-reflection surveys. While completing the modules, participants also meet weekly (for one hour) with a mentor coach onsite to reflect on module content, provide feedback on the implementation of the strategies learned, and support ongoing use of the strategies through action planning. Mentor coaches were identified from the same programs in which participants worked and had received training on using mentoring practices.

Similarly, Chen et al. (2009) also described a series of online modules, but did not include a mentoring component. Instead, the in-person interaction used in this project included an initial meeting with participants before they completed the modules, and a final meeting afterwards. Both meetings were five hours in length. The initial meeting was held to orient participants to the project and the final meeting served as a debriefing opportunity, occurring at the end of the 16-week course. While participants completed the online modules, a small group meeting was held at the midpoint in the course using videoconferencing. An optional online meeting was also offered for support, during which a small group of participants engaged using text discussion. Participants received support while completing the nine required online modules through asynchronous threaded discussions with peers and instructors. Modules contained learning objectives, described the topic, demonstrated key strategies using videos, discussed cultural and family values related to the topic, addressed teaming, and included an illustrative vignette and online quizzes (five quizzes total, for modules four through eight only). Participants were required to complete assignments including case-based problem-solving and reflection papers. They also were expected to engage in online discussions initiated by instructor questions.

In both studies, the majority of the professional development was provided using webbased modules. In-person interactions occurred to support the use of the modules and the implementation of content learned from them. Specific practices were addressed in each module that were aligned with standards identified in the EI field. The training activities were designed to build participants' capacity to use these specific practices. Training activities occurred over time, requiring that participants complete activities on a weekly basis. Completion of the modules and participation in in-person meetings occurred across 16 weeks for one study (Chen et al., 2009) and a minimum of 24 hours of online instruction for the other study (Kyzar et al., 2014). The on-site mentoring provided in the Kyzar et al. (2014) work better represented the guidance provided by NPDCI (2008) in terms of including feedback to support application of learning. While Chen et al. (2009) provided some guidance during the course, participants themselves appeared to bear most of the responsibility of reflecting on their learning through assignments, rather than reflecting with a mentor on their actions.

*Online data system, website access and in-person meeting(s).* Professional development activities described in two studies were designed to increase participants' use of evidence-based practices through ongoing interaction with an online data system. Ridgley et al. (2011) designed a "job-embedded professional development intervention" (p. 313) which supported decision-making during the IFSP development and monitoring processes. This activity involved three components: 1) workshops, 2) digital learning objects within the TEIDS-Plus (i.e., text prompts, forms, practice examples, fidelity checklists), and 3) an instructional website. Eight service coordinators from two EI programs in Tennessee participated in a feasibility study of this

professional development system. Participants attended a 3-day workshop to learn about IFSP development and recommended practices. Following the workshop, participants regularly used the TEIDS-Plus data system whenever they entered data related to a child's IFSP. The digital learning objects (i.e., prompts, checklists, and other cues designed to support or maintain learning) embedded in the TEIDS-Plus prompted participants to: 1) use tools for gathering information for a functional assessment of routines, priorities, and resources, 2) identify individualized intervention strategies and make decisions regarding IFSP outcomes, 3) coordinate services, and 4) monitor progress during monthly visits with the family. Service coordinators entered data into the TEIDS-Plus on a daily basis but following the digital prompts was optional. Prompts also linked to a website to provide further information about the use of recommended IFSP practices. Information available on the website included a variety of printable documents, guidelines for IFSP development and decision-making, family stories and videos, resource lists, descriptions of practices and strategies, checklists, assessments, and surveys.

Additionally, Buzhardt et al. (2011) designed a series of professional development activities to support practitioners in using an online data system to make informed decisions about intervention. Forty-eight Early Head Start home visitors participated in annual in-person training in the use of the data system, administration of the *Early Childhood Indicators* (ECI, Walker & Carta, 2010) tool, and decision-making about intervention. Participants completed a certification process to assure that they were well-trained in administering and scoring the ECI. They were also given access to two intervention manuals and the online data system. For one group of participants, the online data system included the Making Online Decisions (MOD) program, which was designed for this study. The MOD program prompted participants through a five-step decision-making process to guide individualized intervention decisions. Prompts included questions that participants answered about the specific child being served. Whenever information from the ECI was entered into the data system that fell below a certain benchmark for the child's communication level, the MOD questions were triggered to guide a participant to a correct response. These questions led to suggestions for intervention strategies based on content from the two intervention manuals. Suggestions included increasing or decreasing services, completing fidelity checklists related to intervention practices, or exploring additional interventions. Participants in the MOD group completed an additional 2-hour in-person training in the use of the MOD program prior to accessing the program within the data system. Indirect follow-up was provided by the authors of the study via monthly calls and emails with supervisors of the service coordinators participating in the MOD condition to discuss implementation issues.

Professional development activities in both studies included initial in-person workshops to introduce participants to the training content and to allow them to practice interacting with the tools provided. Both studies implemented job-embedded professional development through an online data system with which participants interacted as a part of their regular job duties. The embedded nature of both systems strongly supports the immediate application of learning through on-the-job practice and participants' own evaluation of the outcomes of their work with children and families recommended by Dunst (2015). The focus of both studies seemed to be on planning for using the data systems and applying recommended practices to child and family support as prompted by cues embedded in the data system. The practices embedded in both systems were aligned with recognized professional standards related to IFSP development and communication intervention. Both activities were sustained over time, with prompts embedded in the data systems to provide guidance to users. However, since participants in both Buzhardt et

al. (2011) and Ridgley et al. (2011) could choose to implement what was suggested by the systems' prompts (or not) and choose to access corresponding resources (or not), the potential long-term impact of both professional development activities on the participants' practices is unclear.

Web-based discussions and in-person meetings. In contrast to the previous studies, the professional development activity described by Chen et al. (2008) required that participants engage during in-person meetings and web-based discussions in order to complete an asynchronous in-service course. Eighty-six EI service providers completed the web-based course designed to teach them to implement strategies from the Promoting Learning through Active Interaction (PLAI): A Guide to Early Communication with Young Children who have Multiple Disabilities (Klein et al., 2000) curriculum with infants and toddlers with multiple disabilities and their families. The course components included: 1) an initial 5-hour in-person meeting, 2) 14 weeks of online discussion during which participants were also completing five online learning modules, and 3) a final 5-hour in-person meeting to conclude the course. The initial meeting included an introduction to the course website where the modules were housed, an overview of the PLAI curriculum with video demonstrations, and exploration of the PLAI manual and accompanying video for home study. Participants were then required to participate in online discussions at least twice each week related to instructor-posted questions. Discussion questions were designed to stimulate feedback on how participants used the PLAI intervention strategies and adapted them to family routines and activities. The course website offered discussion boards where students could post questions. Optional activities included synchronous chat meetings to address individual participant successes and challenges with using the curriculum. Participants also completed assignments, including a written paper based on a caregiver interview, a feedback form after completing each module, a case study describing the implementation of intervention strategies, and a 10-minute video of the participant using the PLAI strategies with a family (only required when taking the course for a grade which 26% of participants decided to do). The final meeting was conducted as a debriefing session, during which participants presented their case studies and other assignments and provided feedback about the course to the instructor.

Participants in this study received a great deal of information about implementing specific PLAI strategies, which were developed from research on intervention for young children with multiple disabilities. Course assignments challenged participants to relate what they were learning to their actual job practices. The professional development activity was sustained over time due to the inclusion of two in-person meetings and required modules that had to be completed during the 14 weeks between meetings. Limited guidance or feedback was provided on how practices were applied due to the nature of the semester course, which did not include a coaching component. This activity increased participants' knowledge of how to promote infant and toddler development, but long-term effects on the actual application of this knowledge and its impact on practices are unknown due to the lack of feedback provided to participants about their actual practices.

*Technology-mediated only (no in-person or face-to-face component).* Only one study described a professional development activity that was provided completely via online technology with no face-to-face component, either in-person or via face-to-face interactions using technology (e.g., Skype, Adobe Connect). Participants in the activity described by Brown and Woods (2012) did interact with the instructor on a 1-hour orientation conference call, but this call did not have a video conference, or face-to-face, component. Communication occurred primarily by email as participants progressed through a series of five 6-hour asynchronous

"content units" designed to teach them about using caregiver coaching strategies to help caregivers facilitate communication intervention with their infants and toddlers (who were eligible for EI) during family routines. Participants, who were all special instructors providing EI, had eight months to complete all content units. Each unit included readings, video and audio examples to illustrate strategies being taught, and opportunities for participants to watch videos then answer questions about the video and receive automated feedback based on their answers. Each content unit ended with an assessment project to demonstrate participants' competency. At the conclusion of the training activity, participants submitted a final paper and video demonstrating their use of the strategies. They submitted another video and paper 6-8 weeks post-training to measure maintenance of learning. Feedback was provided to each participant about these products by instructors.

While this PD activity was entirely technology-mediated with limited direct contact between the instructors and participants, efforts were included to facilitate participants' active use of practices being learned, self-assessment, and reflection on video samples submitted by participants. The practices being taught were grounded in the evidence-based FGRBI model. Professional development for these participants was sustained over an 8-month time period and included several opportunities for participants to practice applying their learning using assessment projects and video and paper submissions. It appeared that feedback was only provided by the instructors on participants' direct use of what they were learning following the video submissions. It is unclear if this feedback was provided through a reflective process or simply involved the instructor emailing the participant to share one-way guidance. Similar to the methods used in the Chen et al. (2008) study, the omission of direct coaching or consultation during or after the delivery of training may have weakened its long-term impact. *Summary of how PD was delivered.* Regarding the delivery of technology-mediated professional development, the nine studies reviewed reflect the variety of methods used within the EI field. Most studies included a face-to-face component, either as in-person meetings, onsite mentoring, or face-to-face interactions using video or teleconferencing. All studies except one (Brown & Woods, 2012) supplemented in-person interactions during workshops or meetings with technology-mediated learning activities. Technology-mediated activities were synchronous, with participants engaging with trainers, and at times with peers, in reflective learning activities, or asynchronous, requiring that participants complete online modules independently within a specific period of time. In the study of a technology-mediated professional development activity which did not include any face-to-face or in-person interactions (Brown & Woods, 2012), interactions with trainers occurred electronically. Five other studies (Behl et al., 2012; Brown & Woods, 2012; Chen et al., 2008; Chen et al., 2009; Maturana & Woods, 2012) included electronic communications, such as emails or online discussions, as well.

In all of the nine studies reviewed, the topics of professional development were aligned with professional goals and practices currently used by participants. No training activities were one-shot workshops. Instead, all included multiple components to facilitate adult learning across time. Timeframes for professional development varied across studies, lasting between three to eight months. Seven studies described learning objects designed to support professional development, including readings and multi-media demonstrations of practices embedded in modules or content units or available on a self-study DVD or CD-ROM; intervention manuals and other printed or electronic resources; and digital prompts embedded in a database system. Only four of the studies included an ongoing support mechanism, such as team supervision, mentoring, or participation in a learning community. Ongoing support was provided primarily using technology, such as web-, video-, or teleconferencing and email, with the exception of one study (Kyzar et al., 2014) which described ongoing support as provided by onsite mentors. Similarly, Maturana and Woods (2012) described peer mentoring, which included peers who worked for the same agency for some participants. All of the studies were similar in their goals of providing professional development to positively affect EI practitioners' practices and decision-making skills. The studies differed in the design of training and the methods used to delivery it. Differences in how guidance or feedback was provided and in opportunities for ongoing, collaborative support may have impacted the outcomes of the professional development described in these studies, which will be summarized next.

## **Effectiveness of Technology-Mediated In-Service Professional Development**

Variation in the designs of training activities likely impacted their effectiveness on learner outcomes. In addition to describing the "who," "what," and "how" of the activities, each study also measured the effectiveness of the overall activity and its components. Effectiveness was measured in different ways, but most often included pre/posttest knowledge or perception of knowledge measures (e.g., multiple choice questions, open-ended questions, case scenarios) and surveys that allowed trainees to rate their satisfaction with the activity. Other evaluation methods included measures of participant perceptions about specific aspects of the professional development activities; frequency of intervention strategy use; treatment fidelity across conditions; frequency of use of learning objects or elements in a data system; review of products produced (e.g., IFSPs, resource materials); and measures of child progress. All studies reported positive outcomes of professional development as well as limitations and recommendations for practice or future research. Effectiveness of the reviewed studies will be discussed below according to the methods used to deliver training. **Video or teleconferencing, in-person meeting and/or mentoring.** To measure effectiveness of professional development activities that integrated video or teleconferencing with in-person training and/or mentoring, three studies used different methods to evaluate training effects. All three studies employed surveys to measure participant satisfaction. Maturana and Woods (2012) and Vismara et al. (2009) used both quantitative and qualitative methods to measure the effects of PD, while Behl et al. (2012) only used qualitative measures (i.e., summaries of group discussions, review of products developed, responses to open-ended questions on surveys).

Maturana and Woods (2012) measured the use of caregiver coaching strategies by participants, the routines used during intervention visit videos, the fidelity with which feedback was provided during expert mentoring sessions, and satisfaction with the DMM. Videos submitted by participants were coded using a 30-second interval coding system developed as part of the FGRBI model. Videos were coded for the frequency of use of caregiver coaching strategies and for the type of routine used with the family during the intervention visit. An initial video was submitted before the training began, then subsequent videos were submitted monthly following the in-person workshops. Videos were also edited into shorter clips by expert mentors who provided feedback to participants on their use of the strategies. Analyses revealed that participants decreased their use of child-focused intervention (i.e., the service provider working with the child without helping the caregiver engage with the child) between the first and fourth videos with large effect sizes noted (d = 1.02). Large effects were also noted for changes in the use of specific coaching strategies between the first and forth videos (d = 0.97). Video analysis revealed significantly more use of family and community routines and less use of play routines after the first video, with medium effects reported (play d = 0.63 and family/community d =

0.62). These findings suggest that this professional development activity was effective with regard to increasing the use of caregiver coaching strategies overall, and within family and community routines. An interesting qualitative finding was noted related to the delivery of performance feedback. Using paired sample *t*-tests, these authors compared participant performance (based on analyses of video submissions) and found no differences in performance related to whether feedback sessions were conducted using face-to-face video conferencing (via Skype) or using teleconferencing (via conference call only).

Maturana and Woods (2012) also noted outcomes related to performance feedback. Performance feedback achieved 100% fidelity across 30% of sessions which were observed and coded. Twenty-four participants completed an online survey and indicated their satisfaction with interactions during feedback sessions, watching video clips of intervention sessions, and the overall mentoring experience. Challenges shared by participants related to finding the time for study activities and scheduling feedback sessions. Participants highly valued the workshops, and the majority (87%) noted that participation in the DMM helped them achieve their goals.

Vismara et al. (2009) reported a similar finding when they compared fidelity results across training delivery types. Participants in their study attended a training seminar after completing self-instruction on the ESDM. Half of participants attended the training in-person, and the other half attended via teleconferencing. Findings revealed that there were no significant differences in fidelity measures based on the method of participation, suggesting that professional development delivered using distance technology was as effective as the same content delivered in-person. Fidelity was measured using the author-developed ESDM fidelity tool to score video submissions of participants implementing the ESDM intervention. Treatment fidelity was observed to significantly increase between the baseline video and the completion of the self-instruction phase, and between self-instruction and the training seminar. Because the ESDM was designed to help participants support parents in using the same strategies with their children, both parent fidelity and child progress were also measured. Parent fidelity was not associated with how the service provider participant used the ESDM strategies but child progress did increase as participant fidelity increased. Measuring both parent fidelity and child progress were strengths of the Vismara et al. study. Maturana and Woods (2012) did not measure these aspects, which was a limitation. Nonetheless, both studies were limited by small sample sizes (e.g., 10-18 participants) and by the confounding variable of time across professional development activities as both studies had lengthy training phases (five to eight months).

Behl et al. (2012) was also limited by the small number of 15 participants in their telepractice learning community, although it could be argued that the small sample size was necessary to effectively facilitate the activities. To measure the effects of participation in the learning community, Behl and colleagues evaluated knowledge gained from participation, products completed, and participant satisfaction. It was unclear how knowledge gains were measured, but the authors reported that participants had a better understanding of technology to support telepractice, licensure and reimbursement policies, and methods of evaluation of their use of telepractice. Participants developed a resource guide which included multiple tools to assist with telepractice and posted this guide on a website at the conclusion of the study. Two surveys were completed by participants to assess their experiences following the initial meeting and after six months of conference calls. Participants reported positive experiences including feeling validated, learning about new technologies, and appreciating having access to new resources. They valued the collaborative learning and sharing of experiences that the community offered and felt that participation had enhanced their practices. Unlike the previous studies, this

study was limited by the lack of information provided about the training content discussed during the conference calls, making it challenging to discern details about the "what" of professional development, and if indeed the training met the research goals.

All three studies reported positive outcomes for participants in terms of increasing their knowledge of and/or use of evidence-based practices for providing EI. These studies also had small sample sizes, but this may have been necessary to accomplish the goals of the studies which related to increasing knowledge and the use of evidence-based EI practices through initial in-person training followed by ongoing support. All studies included multiple measures, but generalizability of the results of each study is difficult due to the very specific target populations included in the studies. An important finding from two of these studies suggests that professional development that is technology-mediated may be as effective as training provided in-person.

Web-based modules and in-person interactions. Both Kyzar et al. (2014) and Chen et al. (2009) reported results from usability (e.g., ease with which web-based modules could be accessed) and satisfaction surveys of participants. Participants in both studies reported that they were satisfied with the training content and reported that module content was relevant to their jobs as EI educators and therapists. While participants in the Kyzar et al. study indicated low ratings for usability and practicality, participants who completed the online modules in the Chen et al. study indicated that having access to practical information that applied to working with children with multiple disabilities was a benefit. Further, participants in the Chen et al. study reported having significantly greater competence at the end of the course based on pre/posttest self-evaluations of their own perceptions of knowledge and skills. The authors of this study concluded that a combination of in-person meetings and online learning appeared to be best for facilitating learning in their participants.

The qualitative usability and satisfaction survey conducted by Kyzar et al. (2014) focused on one of the online modules in the course. Participants reported that inclusion of interviews with experienced service providers and families, session scripts, intervention videos, downloadable documents and periodic knowledge checks in the modules were helpful. Kyzar and colleagues also conducted focus groups to gather specific feedback about the mentor coaching experience following the training. Four mentors and four learner participants who participated in the focus groups indicated that they valued the mentor coaching meetings for the opportunities they provided for self-reflection about the use of what was being learned. Scheduling was difficult and it was important to hold the mentor meetings within the same week during which the participant completed the intervention session with a family. The importance of mentors being experienced and working in the same program as the learner participants was reported by focus group participants. Similar to the findings reported by Maturana and Woods (2012) and Vismara et al. (2009), participants reported that they believed that mentoring could have been as effective if provided online as it was onsite.

Findings from both studies that included online modules and in-person meetings were primarily limited by the self-report nature of the outcome measures. Family outcomes were not measured, and only participant perceptions were reported. However, the use of focus groups in Kyzar et al. (2014) strengthened this study's findings with the detailed feedback provided that could be used to improve the mentor coaching experience and its effectiveness. In both studies, participants appeared to be satisfied with their learning experiences. Participants in the Kyzar et al. study reported perceptions of the learning experience being more practical, perhaps due to the mentor coaching support that was provided throughout the completion of the modules. In contrast, participants in the Chen et al (2009) study reported the lowest ratings on practicality of training content. A primary difference between these two studies was when the in-person support occurred. These findings suggest that the addition of mentor coaching throughout a professional development activity, as opposed to in-person contact with instructors primarily before and after training, may be associated with participants perceiving training content as more practical and useful.

**Online data system, website access and in-person meeting(s).** Authors of the two studies that integrated online data systems into professional development also hosted in-person meetings before participants engaged with the online resources. Both Ridgley et al. (2011) and Buzhardt et al. (2011) reported findings from information gathered about the use of the online data systems. Ridgley et al. (2011) conducted focus groups with all participants to determine their reactions to the training, their impressions of the learning objects embedded in the TEIDS-Plus, and the applicability of the TEIDS-Plus prompts in their work with families. Hit data (i.e., number of clicks on specific learning objects) from the data system was also used to verify feedback provided about how the TEIDS-Plus was used. Participants reported that the workshops were helpful, but that additional one-on-one support would have helped them learn to use the learning objects and implement the IFSP development practices which were the target of the overall training activity. Ongoing feedback was also suggested as an additional support that would have been helpful. Participants reported that the TEIDS-Plus learning prompts and links to online resources were valuable, especially when helping them address an immediate need related to IFSP development. Hit data confirmed this by indicating that the most frequently accessed learning objects were those that informed progress monitoring. Participants reported that families benefitted from the improved IFSP development process, and a survey to assess parent perceptions confirmed that the IFSP process was perceived as positive for families. The themes

reported by participants of immediacy and needing additional support to address ongoing needs are similar to the findings reported by Kyzar et al. (2014) related to the increased practicality of professional development including mentoring, which could fill that need for immediate and ongoing support and feedback.

Like Kyzar et al. (2014), Buzhardt et al. (2011) reported hit data from an online data system and assessed participant satisfaction. This study, however, also reported data on child progress. These authors used a randomized-control trial design to assign home visitors to a group which accessed the data system without the MOD prompts and another experimental group who had access to the MOD prompts. Participants in both groups implemented the ECI tool equally well, but the children served by participants in the experimental group demonstrated significantly improved communication development. MOD prompts moved participants through a 5-step decision making process, from identifying the presence of a problem (step 1) to determining if intervention to address the problem was working (step 5). Findings revealed that all participants implemented the first step from the process with children on their caseloads, but only about half of all child cases proceeded to steps 2-4, which involved determining the cause of the problem, which intervention to use, and whether or not the intervention was being implemented. Participants only completed step 5 with 12% of children on their caseloads. The authors speculated that these low numbers may be due to children exiting the Early Head Start program before additional ECIs were administered and entered into the system. Procedural fidelity was also assessed using checklists completed by participants at initial and follow-up visits with families. Fidelity scores were highest on the initial visit for sharing the ECI results and an intervention handout, yet lowest for modeling how to use an intervention strategy with the child for the parent. On the follow-up visit, scores were 100% confirming that the home visitor

reviewed strategies with the primary caregiver, talked about using strategies across additional routines, talked about how much the caregiver used the strategy, and left an intervention handout with the caregiver. Participants in the MOD group reported that they used all of the strategies suggested by the MOD prompts about 73% of the time. Participants also shared the MOD reports about the child's progress with the family 54% of the time. Regarding satisfaction, participants in the MOD group reported that the data system with the MOD prompts was useful and that they were highly satisfied. The use of prompting based on individualized child data entered in the data system appeared to be supportive of home visitors making decisions that had positive effects on child progress.

Both studies demonstrated that embedding prompts in frequently-used online data systems could have positive effects on intended outcomes. For Buzhardt et al. (2011), training plus responses to online database prompts appeared to be associated with greater child progress. Similarly, training plus accessing embedded learning objects that supported the implementation of evidence-based practices in the Ridgley et al. (2011) study was associated with improvements in the IFSP development process and positive experiences for families. Both studies were limited by the fact that other confounding variables could have affected the results, such as participant comfort with technology or prior experience with the ECI tool or with IFSP development. Both studies also relied on perceptions for most of their data collection and employed limited measures to verify these perceptions. However, the consistency in findings across these two studies suggests that professional development that includes embedded prompts in online data systems may be useful in supporting the implementation of recommended EI practices.

**Web-based discussions and in-person meetings.** Rather than designing online modules or data systems to facilitate professional development, Chen et al. (2008) facilitated a web-based

course using instructor-led web discussions. Pre/posttest analysis using paired sample *t*-tests were employed to determine participants' perceived competence before and after the course. Results indicated that participants felt significantly more competent at the end of the course. Participants completed a satisfaction survey after the course and an additional short survey during the final in-person meeting, revealing most positive ratings about accessing the course website, accessing the internet and interacting with the instructor. Online discussions were found to be helpful as were having practical strategies to use with children and families. Analyses of videos submitted by participants revealed that implementing the strategies was challenging, with only 24% of participants demonstrating use of strategies throughout the study. However, changes in caregiver behaviors, and in some cases, child behaviors, were noted in the videos too. Instructor feedback described web discussions as tools to increase student confidence and engagement. Instructors noted that providing ongoing reflective feedback through the web discussions provided participants with more frequent opportunities for feedback than they would have received in an in-person course. Case-based discussions and demonstrations in the video examples provided to participants encouraged them to apply their learning with real families and receive feedback about it during the web discussions and the final meeting. While this study sample was larger than some of the other studies in this review at 84 participants, all participants were from within one state and a larger percentage (27%) had certification in severe disabilities (which was the population of children for whom the strategies taught in this course were targeted). It is possible that participants in other states and those without specialized training with this population may experience different outcomes. However, findings from this study suggest that the use of an ongoing approach to technology-mediated professional development that includes opportunities for participants to apply learning to real cases and receive real-time

feedback appears to be associated with positive perceptions of student confidence and the overall learning experience.

Technology-mediated component only (no in-person or face-to-face component). The final study in this review (Brown & Woods, 2012) examined learning outcomes following training in the use of evidence-based intervention methods and coaching strategies for influencing infant and toddler communication development. Two pre/posttest measures were used, along with a self-report satisfaction survey. Before beginning the online content units, participants completed a case study application pretest and a knowledge and skills survey. Posttest measures repeated these two assessments, with an additional training satisfaction survey. Participants submitted videos immediately after completing the content units and 6-8 weeks after completion for a measurement of maintenance of skills and knowledge. All participants showed increased knowledge and skills during and after training and rated overall satisfaction highly. Video submissions revealed that all participants used various caregiver coaching strategies. There were no differences in frequencies of strategy use between the two videos, but less time was spent by participants in child-focused interactions in the second video. Over 90% of intervention time was spent engaging children and families during routines, with play (43%) and caregiving (24%) being the most common across videos. The authors reported that the most significant impacts of the professional development activity were in participants' increases in knowledge and abilities to apply what they learned during visits to address and promote communication development.

Strengths of Brown and Woods (2012) included the use of two pre-posttest measures and video analysis after the training. Limitations included the small sample of 24 participants who completed all content units, the absence of baseline videos, and, like all but one other study

(Buzhardt et al., 2011) in this review, the lack of a comparison group. Findings were similar to those in the other studies, including high satisfaction and improved knowledge and skills reported in participants' surveys. While the findings of this study may not have been as strong due to weaker measures, the description of procedures and measures (the "how") provided by the authors was very detailed, which aids the EI field in identifying different means of providing professional development to in-service EI practitioners.

**Summary.** All studies in this review reported high satisfaction with the professional development provided to inservice EI service providers, based on survey or focus group feedback from participants who shared self-report information. Participants reported satisfaction with specific elements of training, including video demonstrations of practices, audio interviews with experienced providers and families, intervention scripts, downloadable documents, periodic knowledge checks, embedded prompts in data systems, case-based discussions based on real situations, interactions during real-time feedback sessions conducted using distance technology, and opportunities for self-reflection during onsite and technology-mediated mentor coaching. Participants also reported and/or demonstrated (depending on the study) increased knowledge and skills and improved feelings of competency at the completion of training. Participants across studies provided positive feedback about all the professional development formats reviewed. While participants valued professional development provided through workshops, video or teleconferencing, online modules, web discussions, learning communities, and embedded learning objects, results from four studies (Behl et al., 2012; Brown & Woods, 2012; Buzhardt et al., 2011, Maturana & Woods, 2012) emphasized the importance of ongoing support after an initial training activity.

Ongoing feedback or mentoring provided during professional development appeared to be associated with participants reporting that content was more practical and that they had an increased ability to apply what they were learning in their work with children and families. Challenges were reported by those who received mentoring related to scheduling and timing of meetings with mentors, suggesting that mentoring provided at predictable times during a training activity may be helpful to participants. Participants also reported benefits of a collaborative learning environment and sharing of experiences among learning community mentors. Results of three studies suggested that technology-mediated professional development may be equally as effective as training provided face-to-face (with or without technology) or in-person.

Overall, findings about effectiveness of the reviewed studies suggest that technologymediated, multi-component professional development can be effective using a variety of formats to facilitate learning. Participants seem to value training elements that illustrate practices, help them make decisions, and promote self-reflection and sharing of feedback between mentors and participants or among participants. Ongoing support as a component of professional development that includes opportunities for case-based discussion, reflective feedback, mentoring and collaboration across learners may be important to facilitate participants' use of what they are learning, which is an important goal of any training effort. Additional research is needed to determine the effectiveness of a multi-component professional development approach that includes a variety of technology-mediated elements to build knowledge, illustrate practices, engage participants in self-reflection, facilitate shared feedback, and provide ongoing support that promotes participants' use of evidence-based EI practices.

### **Delivery of Effective Technology-Mediated In-Service Professional Development**

Ongoing coaching, mentoring, or other support is recommended as essential in the professional development literature for facilitating transfer of learning (Church et al., 2010; Conroy, Sutherland, Vo, Carr, & Obston, 2014; Gentry, Denton, & Kurz, 2008; Hobbs et al., 2011; Joyce & Showers, 2002; Kretlow & Bartholomew, 2010; Kretlow et al., 2012; McDonough, 2013; NPDCI, 2008; Penuel et al., 2007; Snyder et al., 2011; Watson & Gatti, 2012). Differences in the type and timing of ongoing support can be examined at a deeper level by comparing the studies in this review according to Dunst's (2015) seven key features of effective in-service professional development model, which emphasize ongoing, reflective, jobembedded support for adult learners. The process components of the studies in this review are compared across these seven features in Table 11.

# Table 11

Studies Analyzed According to Dunst's 7 Key Features of Evidence-Informed Inservice Professional Development Model (2015)

Study citation	Feature 1: Explanation and illustration	Feature 2: Job-embedded opportunities	Feature 3: Different types of practices for engagement and reflection	Feature 4: Coaching, mentoring, performance feedback during training	Feature 5: Ongoing follow-up	Feature 6: Sufficient duration and intensity with multiple opportunities to practice	Feature 7: Includes most of these six features
Behl et al. (2012)	X				X	X	
Brown & Woods (2012)	X		X		X	Х	
Buzhardt et al. (2011)	X	X	X		X	X	X
Chen et al. (2008)	X		X			Х	
Chen et al. (2009)	X		X			X	

Study citation	Feature 1: Explanation and illustration	Feature 2: Job-embedded opportunities	Feature 3: Different types of practices for engagement and reflection	Feature 4: Coaching, mentoring, performance feedback during training	Feature 5: Ongoing follow-up	Feature 6: Sufficient duration and intensity with multiple opportunities to practice	Feature 7: Includes most of these six features
Kyzar et al. (2014)	X	X	X	X		X	X
Maturana & Woods (2012)	X	Χ	Χ	X	X	Х	X
Ridgley et al. (2011)	X	Χ	X			X	
Vismara et al. (2009)	X	X	X	X		X	X

*Note.* An "**X**" indicates that the study included the corresponding key feature. A dash (---) indicates that the study did not include that key feature. For Feature 7, a study was marked "**X**" if it included at least five of the six other key features.

The only features included in all studies were Feature 1, indicating that all reviewed studies provided some information about how the practices being taught were explained or illustrated, and Feature 6, indicating that all studies were conducted across time (rather than as single workshops) and included multiple opportunities for learning. Maturana and Woods (2012) did not provide explicit information about Feature 1, but based on the fact that all participants in their study had previously attended workshops about the FGRBI approach, it is reasonable to assume that the corresponding practices were discussed. Five studies addressed Feature 2 by included job-embedded opportunities for participants to practice using what they were learning. These opportunities included onsite mentor coaching while on the job (Kyzar et al., 2014), participants recording themselves or reflecting on intervention visits and receiving feedback on their performance from trainers and peers (Maturana & Woods, 2012; Vismara et al., 2009), and the use of learning objects when entering current data about children and families on participants' caseloads (Byzhardt et al., 2011; Ridgley et al., 2011). Feature 3 was implemented in eight studies with varying specificity. Professional development practices used to facilitate engagement and reflection included: 1) knowledge checks, self-reflection questions, case-based problem-solving and fidelity checklists embedded in modules, stored on websites, or offered to participants as learning tools (Brown & Woods, 2012; Buzhardt et al., 2011; Chen et al., 2008; Chen et al., 2009; Ridgley et al., 2011; Vismara et al., 2009; 2) peer or expert mentoring (Maturana & Woods, 2012; Kyzar et al., 2014; Vismara et al., 2009); 3) video demonstration, review and feedback (Brown & Woods, 2012; Maturana & Woods, 2012); and 4) reflective supervision provided during technology-mediated discussions (Vismara et al., 2009). Features 4 and 5 focused on ongoing support during and following training. Only three studies addressed Feature 4 by providing mentoring (Maturana & Woods, 2012), mentor coaching (Kyzar et al.,

2014), or performance-based feedback during the training activity (Vismara et al., 2009). Four studies described efforts for ongoing follow-up after training which aligned with Feature 5, including ongoing distance mentoring for one year after participants attended workshops (Maturana & Woods, 2012), submission of videos of intervention visits with written reflections six to eight weeks after training (Brown & Woods, 2012), participation in learning community calls for six months (Behl et al., 2012), and follow-up communication by email or phone with administrators three months after the initiation of the PD project (Buzhardt et al., 2011). Regarding Feature 7, only one study (Maturana & Woods, 2012) appeared to address all seven features. Three other studies included six of the seven features (Buzhardt et al., 2011; Kyzar et al., 2014; Vismara et al., 2009), with the most common features missing being Feature 4 or 5.

Across features, the least emphasis appears to have been placed on Features 4 and 5, which both focus on ongoing support to learner participants, during and after training. If Dunst's (2015) key features of evidence-informed inservice professional development are a valid way to analyze future training projects, it would appear that there is a significant need to report research on technology-mediated professional development for EI service providers that addresses all seven features and clearly describes the implementation of these features. Since Features 4 and 5 were the most likely to be missing from the reviewed studies, the importance of investigating the effects of coaching, mentoring, and performance feedback during training (Feature 4) and ongoing follow-up after training (Feature 5) should be emphasized.

When ongoing support is present, it appears to be more likely to occur after the training during follow-up activities. While this is important, it may not meet the need reflected in this review for support with immediate needs related to applying learning during training. This analysis of the literature revealed a general lack of emphasis on ongoing support, which, according to results from studies which included it, appears to be very important when the goal of professional development is to help participants learn to use evidence-based or recommended practices in a practical manner with infants and toddlers enrolled in EI and their families.

#### Discussion

Nine studies were reviewed to examine the process components of technology-mediated professional development for in-service EI service providers published within the past ten years. Process components from the NPDCI (2008) were used to guide the analysis of who participants were, what content was taught, and how training was provided. Effectiveness of the professional development provided in these studies was also analyzed across methods of delivering training for common themes. Finally, each study was analyzed according to Dunst's (2015) seven key features of evidence-informed in-service professional development model to identify strengths and limitations of technology-mediated efforts and provide guidance for future research and training. A summary of key findings follows.

## **Comparisons across NPDCI Components**

Regarding the "who" of professional development, participants in the reviewed studies included practitioners from EI (under Part C of IDEA) and Early Head Start programs. Practitioners were self-selected to participate in training. When reported, most participants were female, had a minimum of a Bachelor's degree, had less than seven years of experience working in EI, and were from disciplines or professions common to the EI field. Analysis of Table 8 indicates inconsistencies in the amount of information reported about participants across studies. This lack of demographic information may be due to commonalities within the field (i.e., EI practitioners are typically white females with a college education) which authors may not have found necessary to report. However, inconsistencies in information about levels of education and experience may have significant effects on the effectiveness of professional development, as adult learners typically draw on their prior knowledge to assimilate new information. To determine the appropriateness of replicating a training activity for a particular audience, a more consistent approach to describing the "who" of professional development is needed.

Similarly, understanding the "what" of professional development, or the content being taught, is important for determining which efforts warrant replication and can be considered "evidence-based" for future training activities. All nine studies included descriptions of content related to the implementation of EI services, though the level of detail varied from welldescribed to minimally described. Five studies used pre-developed training curricula or programs as content for professional development. The other four studies developed content for the training activity being studied based on the designated training topic. Overall, instruction across studies focused on three main topics: 1) teaching participants how to implement evidence-based or recommended practices drawn from the EI literature with infants, toddlers, and their families during intervention visits, 2) how to make data-based decisions, or 3) how to use specific approaches to service delivery with infants and their caregivers. While information about what is being taught is important to serve as a model for other trainers, professional development methods should be equally effective regardless of the topic being addressed. The fact that some studies focused more on describing the delivery of professional development than they did on the training content may reflect this line of thinking.

Detailed information about the "how," or the most effective methods of providing professional development, are needed (Bruder et al., 2013; Buysse, Winton, & Rous, 2009; Dunst, 2015; Odom, 2009; Penuel et al., 2007; Snyder et al., 2011). The review of these nine studies reveals that training reported in the EI literature has generally been provided using a
multi-component approach that includes in-person and technology-mediated interactions to facilitate the learning experience. Authors of eight studies described a variety of in-person activities and all studies included technology-mediated components. Learning objects and other materials were described in seven studies. Even with details provided, it is impossible to disentangle these components to determine the effects of any one component on learning, but the multi-component approaches described in this review were reported to be associated with positive learning experiences for participants.

It is important to note that not all face-to-face interactions in the reported professional development activities occurred in-person; face-to-face interactions between trainers and participants were also provided using distance technology. Results from participant feedback or statistical analysis of participant video submissions in two studies indicated that there were no differences in performance or fidelity based on the method of participation (Maturana & Woods, 2012; Vismara et al., 2009). Similarly, participants in the Kyzar et al. (2014) study also indicated that the mentoring they received onsite could have been as effective if provided at a distance. These findings suggest that, when well-designed, professional development using distance technology to facilitate supportive interactions between participants and trainers may be as effective as training provided in-person. It is clear that more research is needed to explore this possibility. This finding is important given the challenges reported by participants in some studies related to the time required to attend in-person workshops or schedule in-person mentor meetings.

While participants valued professional development provided through workshops, video or teleconferencing, online modules, web discussions, learning communities, and embedded learning objects, results from the majority of the reviewed studies emphasized the importance of ongoing, embedded support. Six studies included ongoing support for participants, provided by the researchers or trainers. Formats for ongoing support were primarily technology-mediated via web-, video-, or teleconferencing and email. Only one study described ongoing onsite mentor coaching. Ongoing technology-mediated support was provided as needed, weekly or monthly, to give learners opportunities to orient to required tasks, ask questions, receive clarification, and participate in reflection and supervision. Ongoing feedback or mentoring provided during training appeared to be associated with participants reporting that content was more practical and that they had an increased ability to apply what they were learning in their work with children and families. Participants also reported benefits to these ongoing interactions related to selfreflection and the opportunity to receive feedback on video submissions or the use of what they were learning while they were learning it. Participants in the Ridgley et al. (2011) study, who only received ongoing computerized support (not face-to-face or in-person), indicated that ongoing support with another person would have been helpful. Analyses of hit data within the database indicated that the learning objects these participants used most frequently were those that addressed immediate needs. This suggests that there is a need for ongoing, embedded support to address immediate needs in the context of professional development, which is most often the intent behind the supportive interactions that occur during mentoring or instructorlearner interactions. Additional research on professional development that examines the use of coaching and performance feedback during training, in accordance with Dunst's (2015) key Feature 4, would inform trainers on effective means of enhancing learning during training and address the need for how to provide this type of embedded support.

#### Measuring Effectiveness of Technology-Mediated In-Service Professional Development

Technology-mediated professional development efforts described in this review appear to be effective in improving participants' knowledge and skills related to implementing EI practices, according to analyses of participant and instructor feedback, video submissions by participants of intervention visits, the use of learning objects and performance on training assignments. Most studies did not examine the impact of professional development on child and family outcomes. However, three studies measured these changes and noted positive effects on child developmental progress or family perceptions of intervention following a training activity (Buzhardt et al., 2011; Ridgley et al., 2011; Vismara et al., 2009). Investigations in this review primarily used methods of evaluating PD that relied on participant perceptions of effectiveness or review of video submissions from participants. Caution is needed when analyzing perceptions of effectiveness because they are not a true measure of professional development outcomes, as they rely on self-report and provide biased information about the impact of training on learner outcomes. In contrast, video submissions from participants allow for more direct observations of practices and can be compared across time to determine changes in actual use of skills learned. Video submissions also have limitations, especially when participants can self-select which families to record and which videos to submit. These strengths and limitations must be carefully considered when comparing study outcomes. Several studies conducted video reviews by expert mentors, researchers or peers, but not all of these studies included a baseline video as comparison. Examination of assignments completed or learning objects accessed were also analyzed using quantitative and qualitative measurements. There is a need for professional development research that includes more direct assessment of the use of knowledge and skills

learned during EI training. Video submissions and reviews are recommended to occur at multiple points in time, with the inclusion of a baseline video before training begins.

While the reviewed professional development activities appear to be effective, the methods used to evaluate effectiveness in some of the studies may have been biased by selfselection (i.e., participants volunteered to participate in study or selected visits to record and submit) and self-report (i.e., participant satisfaction surveys). The use of statistical analyses on results from surveys and coded videos strengthened the power of some of the studies' results, but findings overall could have been further strengthened had it been possible to increase sample sizes or include control groups. Overall, findings could have been strengthened if direct or video observations had been incorporated into all professional development studies to gather stronger measures of effectiveness, rather than primarily relying on knowledge measures or satisfaction surveys, which do not truly inform the field about the learner's actual ability to apply what was learned. There is an "urgent need for high-quality EI professional development" (Brown & Woods, 2012, p. 239) that incorporates Dunst's seven key features of evidence-informed professional development while describing in detail the recipients of training, the content being taught, and the processes used to provide it so that CSPDs have an evidence-base on which to ground their training efforts. To address the need for professional development that is widely accessible, uses multiple means of supporting ongoing learning and reflection, and makes the best use of CSPD resources, research is needed on multi-component, technology-mediated professional development for EI service providers.

#### Limitations

Several limitations of this review must be acknowledged. Search parameters were limited to only include participants working in EI (inservice professionals) to determine the status of

technology-mediated in-service professional development provided to this population. Had the search included studies that examined training for a broader group, perhaps including early childhood special educators or early childhood educators, a wider variety of professional development activities may have been included, but this would not have met the purpose of this review. Similarly, this search also did not include studies that evaluated training for preservice preparation. The knowledge and experiences of preservice and in-service personnel are often widely different, in that in-service practitioners typically have more extensive and immediately relevant prior knowledge of and experience using EI practices. Since the purpose of this review was to examine the status of technology-mediated professional development for practitioners who were already employed in EI, including preservice participants would not have met this purpose. The analysis of the studies against the seven key features model described by Dunst (2015) was based on this author's extrapolation because the terminology used in Dunst's work was not consistently used in the reviewed studies. Dunst's model was published in 2015, after all of the reviewed studies were published. Nonetheless, they represented a compilation of research in adult learning and professional development for EI that had been published in several articles since 2009 (Dunst, 2009; Dunst & Raab, 2010; Dunst, Trivette, & Raab, 2013; Raab et al., 2010; Trivette et al., 2009; Trivette et al., 2012). Despite these limitations, the findings of this review may be useful in informing current and future professional development efforts for practitioners who provide EI services.

#### **Implications for Future Research**

To extend these findings, future research is needed to investigate the effectiveness of technology-mediated professional development as a tool that can be used by states' CSPDs on a broader scale. To determine the use of technology-mediated professional development among

CSPDs and its possible uses and benefits, representatives from each state's CSPD should be surveyed. Once states that use technology in the delivery of training are identified, a closer look could be taken to determine if these activities address the NPDCI core components and Dunst's seven key features model to achieve a measure of quality across CSPDs. This process could be also be used to determine quality of professional development provided by CSPDs that includes in-person training as well, as many states use in-person training as a primary means of providing professional development, to get a more comprehensive picture of quality. Additional research is needed to determine whether training that employs Dunst's (2015) key features model in the planning and delivery of training results in better learning outcomes for participants. Finally, whenever possible, future research in EI professional development should address its impact on child and family outcomes because, ultimately, effective training should result in practitioners who use what they learn to provide the best possible services to those enrolled in EI programs.

### **Implications for Practice**

Findings from this review can be used when designing and delivering multi-component, technology-mediated professional development. These findings confirm recommendations from Snyder et al., (2011) regarding the need for more consistency in how researchers describe early childhood intervention professional development activities. First, describing training participants in more consistent detail would not create an undue burden on authors and would potentially help trainers who are employed by states' CSPDs determine if which activities may benefit their learners. Some participant characteristics might affect the outcomes of professional development as well, such as participants' discipline and levels of previous experience and education. When these are not reported, or not reported in sufficient detail, it is difficult to determine if these characteristics may have been confounds affecting study results. Second, sufficient detail is also

needed regarding training content. When authors provide detailed information about content, this provides trainers with details that they can use when designing professional development around similar topics. It may also increase the likelihood of replication as trainers can identify the studies that apply to their targeted content. With the knowledge that one-shot workshops are not the most effective means of delivering training, trainers need examples of effective and efficient alternatives that they can use. Third, details about delivery would inform trainers about which methods work for changing knowledge, skills and practices, as well as which methods are associated with greater satisfaction and perceptions of usability by participants. Armed with this information, CSPDs can make more informed choices about how to allocate resources to support professional learning among EI providers.

CSPD staff may benefit from comparing current professional development activities to the NPDCI (2008) core components (especially the "how" component) and Dunst's (2015) seven key features model, as done in this review. This exercise would help them identify strengths within their training system, as well as features on which they may want to focus. Future planning for training activities should use these components and features as a guide to ensure that professional development efforts are evidence-based and have the greatest chances of resulting in positive outcomes for participants and the children and families with whom they will apply what they learn.

The results of this review suggest that past multi-component technology-mediated, inservice professional development efforts that have been studied included explanations and illustrations of practices, used a variety of means of engaging participants in reflection, and were provided across time with multiple opportunities for learning and practice. However, a part of academia, it is questionable whether or not these studies reflect the real world of professional development in EI across the country. The training activities in the studies reflected generally well-organized efforts, which, because they were designed by leaders in the field, may be exemplars rather than reflecting typical professional development for EI practitioners. It is important to note, then, that these exemplars typically failed to include consistent coaching, mentoring, or performance feedback during training, and only four studies included ongoing follow-up. Given that these activities may be exemplars, it is likely that the actual status of professional development provided by CSPDs may include even fewer opportunities for ongoing support during and following training. Reasons for this include possible lack of knowledge about components of effective in-service professional development required for positive outcomes or lack of resources (e.g., time, staff, funds). Even in the face of limited resources, trainers have a responsibility to make the best use of CSPD resources. Being well-informed about evidencebased professional development practices, how to organize, describe and measure them, and the importance of including ongoing support in any training activity, will increase the likelihood that professional development efforts result in positive, practical, and long-term changes for practitioners and the child and families with whom they work.

Ongoing support in the form of onsite or technology-mediated mentoring that provides opportunities for participants to immediately apply what is being learned, engage in selfreflection and self-assessment, and reflect on practices that address immediate needs appears to be an essential component of professional development that is associated with positive learner outcomes. Participants appear to want and benefit from ongoing support from a trainer, a peer, or a mentor, which may successfully be provided using distance technology. Professional development that includes opportunities for participants to hear about and watch intervention strategies being used with families, collaborate and share experiences with others, make informed decisions about practices, and receive individualized feedback seem to be most impactful. The findings of this review suggest that providing technology-mediated professional development which addresses specific practices that are aligned with evidence-based, practical knowledge and skills, is sustained over time, includes ongoing support both during and following training, and provides multiple methods and opportunities for learning is an effective way to meet the needs of in-service EI providers who are supported by states' CSPDs.

#### **CHAPTER 3**

#### METHODOLOGY

#### **Chapter Overview**

The literature on technology-mediated inservice professional development for early intervention (EI) service providers is emerging. Leaders in the field (e.g., Brown & Woods, 2012; Bruder, Dunst, Wilson, & Stayton, 2013; Dunst, 2015; Kyzar at al., 2014; Maturana & Woods, 2012; Odom, 2009; Ridgley, Snyder, McWilliam, & Davis, 2011; Snyder, Hemmeter, & McLaughlin, 2011) have suggested that additional research is needed to determine the process components necessary for training to result in positive, long-term changes in service provider practices. This chapter details the methodology for the research project which involves the design, delivery, and evaluation of a multi-component, technology-mediated inservice training course for early intervention (EI) service providers (those serving infants and toddlers with disabilities, and their families) in Virginia. The information provided in this chapter aligns with recommendations from the National Professional Development Center for Inclusion (2008) regarding the need to report on the "who," "what," and "how" of professional training programs. Specifically, information will be provided about the methodology, including the research design, research questions, participants, setting, procedures for conducting the research and the training course, instruments and materials, fidelity, reliability, and the plan for analysis of data.

#### Introduction

According to the mission of EI, "Part C early intervention builds upon and provides supports and resources to assist family members and caregivers to enhance children's learning and development through everyday learning opportunities" (Workgroup on Principles and Practices in Natural Environments, 2008, p. 2). This mission, which is widely recognized in the field, emphasizes the service provider's role as a support to the child's caregivers. As such, the practices used by service providers during EI visits must reinforce learning for both the caregiver and the child, so that when the service provider is not present, the caregiver is confident using intervention strategies that encourage the child's development during daily activities and routines occurring between visits. To ensure that EI service providers are adequately prepared to support caregivers in implementing intervention strategies with their children, professional development is needed that builds providers' knowledge and skills related to facilitating the learning of caregivers – that is, adult learning.

#### **Adult Learning and Professional Development**

Evidence from the professional development literature provides specific recommendations about how training should be delivered to adult learners in order to be most effective. Trivette, Dunst, Hamby, and O'Herin (2009) conducted a research synthesis to examine the effectiveness of four adult learning methods of professional development (i.e., accelerated learning, coaching, guided design, and just-in-time training) to determine which methods were associated with positive learner outcomes. The authors coded 79 professional development studies for the length of training time, how often training was provided, and the adult learning characteristics used during the training to facilitate learning. The adult learning characteristics included: 1) introducing content, 2) illustrating the content and practices being taught, 3) practice opportunities for applying learning, 4) evaluation of the effectiveness or outcome of the practice opportunity, 5) reflection in order to assess one's own learning experience, and 6) mastery, or self-assessment of one's own learning compared to some model or set of standards. These six characteristics were grouped according to three adult learning components (i.e., planning, application, and deep understanding) which were described as essential to positive adult learner outcomes based on previous research. These adult learning components and their characteristics explain the evidence-based rationale behind each of the adult learning principles described in Chapter 1. See Table 12 to review the relationship between the adult learning components, characteristics, principles and their application in a professional development context.

# Table 12

Adult Learning Components, Characteristics, and Principles and their Application during the Training Course

Component	Characteristic	Principle	Application	
Planning	Introduce Illustrate	1) Adults learn best when what is being learned is immediately relevant and useful.	Trainer introduces training content by explaining its immediate relevance to adult learners.	
		2) Adults learn best when new knowledge is built on prior knowledge.	Trainer helps adult learners explore what they already know about the content before presenting content.	
Application	Practice	3) Adults learn best through active participation and	Trainer provides multiple opportunities for adult learners to actively participate in the session.	
	Evaluate	practice.		
		4) Adults learn and remember best when what they are learning is practiced in context and in real time.	Adult learners practice using skills learned in training in the contexts in which they would be applied. Sufficient practice opportunities also occur in real time, rather than in decontextualized activities only occurring during training sessions.	
Deep Understanding	Reflection	5) Adult learners want feedback on their learning and	Trainer and adult learner share reciprocal feedback about adult learner's performance	
	Mastery	performance.		

Component	Characteristic	Principle	Application
			using coaching techniques which facilitate reflection and self-assessment on the part of the adult learner.

*Note:* Adult learning components and characteristics were described by Trivette et al., (2009). Adult learning principles listed were also adapted from Trivette et al. (2009).

Across the four professional development methods, Trivette et al. (2009) found that providing multiple learning opportunities distributed over time (more than 10 hours), training smaller groups of less than 30 participants, and providing trainer-led learning opportunities all appeared to increase the effectiveness of the methods. Results revealed that average effect sizes for positive adult learner outcomes were highest for just-in-time training (d = 0.86), which refers to training that is immediately available when and where the learner needs it, and coaching (d =0.68), which refers to encouragement and performance feedback provided by an expert or peer as the learner applies what was being learned in training. The most effective learning experiences included most, if not all, of the six adult learning characteristics outlined in Table 12. All six characteristics were associated with positive outcomes for adult learners, regardless of professional development method. Overall findings indicated that the more actively involved the adult learner was in the learning experience and in self-assessment of his or her own mastery, the stronger the relationship between the adult learning characteristics and better outcomes for learners (i.e., learners showed greater knowledge gains and greater abilities to use what was learned). Having learners spend time evaluating their own knowledge and performance (effect sizes between d = .60 and d = .96) and reflecting on their use of what was learned (effect sizes between d = .67 and d = 1.07) appeared to be the most important features of a meaningful learning experience since these activities facilitate a deeper understanding of training content (Trivette et al., 2009).

Findings from more recent research by Trivette, Raab, and Dunst (2012) have further specified recommendations for effective professional development to include the use of a combination of adult learning characteristics to support active learning with even smaller groups of learners (less than 20). This more recent work also emphasized the importance of helping learners monitor implementation fidelity using performance-based checklists, which were found to increase learners' understanding and evaluation of their own practices, thereby expediting the learning process. The processes used in both studies by Trivette and her colleagues (2009, 2012) emphasized the application of adult learning principles (see Table 12) in the development of training activities to translate this research into practice. These principles describe what adult learners need in order to successfully attend, actively learn, and be prepared to apply training content. The adult learning principles listed in Table 12 (and described in more detail in Chapter 1) can be applied by trainers, including those employed by states' comprehensive systems of personnel development (CSPDs), when developing, implementing, and evaluating training provided to early interventionists, in order to elevate the effectiveness of EI professional development efforts (Bruder, Mongro-Wilson, Stayton, & Dietrich, 2009; Church, Bland, & Church, 2010; Dunst, Trivette, & Raab, 2013; Kretlow & Bartholomew, 2010).

#### Adult Learning and Early Intervention Service Delivery

Similar to the recommendation that adult learning principles provide the foundation of comprehensive systems of personnel development (CSPDs; Bruder, 2010), Woods, Wilcox, Friedman, and Murch (2011) recommended that adult learning principles should also be applied to EI service delivery, or more specifically, to the actual practices used to support caregiver learning during EI visits. Service providers who practice in accordance with the mission of EI must understand how to facilitate adult learning. It is important to ensure that the caregiver has ample opportunities to: 1) learn about intervention strategies (e.g., planning), 2) actively practice using them during visits (e.g., application), and 3) reflect on their use to assess mastery and plan for continued use of strategies between visits when the provider is absent (e.g., deep understanding). The same adult learning characteristics and principles described by Trivette et al.

(2009; see Table 12) that are recommended for EI professional development can also be applied to the intervention supports provided to caregivers during visits. When integrated into EI practices, the application of these principles should promote caregivers' abilities to plan for, apply, and gain deep understanding of how to enhance their child's development between visits (Trivette et al., 2009).

Joyce and Showers (2002) described deep understanding as necessary if a learner is expected to generalize what has been learned across multiple interactions and activities. Promoting generalization - on the part of the caregivers who interact with their children between visits - is a primary function of EI. Service providers aim to help families use intervention strategies with their children across a wide range of daily activities and routines so that the child is able to adapt and apply his or her abilities to a variety of situations, thereby showing mastery. With this in mind, assisting caregivers in achieving a deep understanding of how to help their children should be a primary goal of EI services, and may be achieved through the application of adult learning principles to both the training service providers receive and the practices they learn to use when interacting with families during EI visits.

Although there has been research which evaluated the effectiveness of technologymediated professional development provided to service providers in EI (e.g., Behl, Houston, & Stredler-Brown, 2012; Brown & Woods, 2012; Buzhardt et al., 2011; Chen, Klein, & Minor, 2008; Chen, Klein, & Minor, 2009; Kyzar et al., 2014; Maturana & Woods, 2012; Ridgley et al., 2011; Vismara, Young, Stahmer, Griffith, & Rogers, 2009), to date there is no research that explores the application of adult learning principles to both the delivery of technology-mediated training and the content being delivered to service provider learners. This research project examined the effectiveness of applying adult learning principles to the delivery of a multicomponent, technology-mediated inservice training course for EI service providers. Service provider participants who engaged in the training course learned how to apply adult learning principles to their practices with families in order to gain a deeper understanding of how and why using EI adult learning strategies supports caregiver and child learning during and between visits. This research evaluated the use of four specific EI adult learning strategies, which were taught to service provider participants during the inservice training course and used by these participants during intervention visits with a caregiver and an infant or toddler both during and after the training.

#### **Research Design**

A within-subjects pretest-posttest design was used to evaluate a multi-component, technology-mediated inservice training course provided to a group of 9 EI service providers. A within-subjects design allowed all subjects to receive the same treatment (Mitchell & Jolley, 2013), which aligned well with an inservice training context in which all participants attend the same training activity. The pretest-posttest design permitted assessment of participants' knowledge and skills before and after treatment to determine if the treatment, or training course in this case, was associated with changes in the knowledge and skills of participants (Mitchell & Jolley, 2013). Since the goal of the proposed inservice training was to change or update participants' knowledge and/or skills, using a within subjects pretest-posttest design provided an appropriate means of measurement.

This case study research involved the development, delivery, and evaluation of a new inservice training course. Participants engaged in a multi-component training course, which included interactive lecture, web-based discussion and case scenario illustrations of how to apply adult learning principles during EI coaching interactions with caregivers. Participants also

applied what they learned by practicing their skills between training sessions with families. Participants received verbal performance feedback on their practice during embedded support sessions designed to support application and develop deep understanding through web-based discussion and reflection. After participants completed the training course, their abilities to apply the knowledge and skills learned were evaluated by comparing pre- and post-training video recordings of their work with caregivers of infants and toddlers with special needs. The independent variable was the facilitation of the researcher-developed multi-component, technology-mediated inservice training course. The dependent variables were: 1) the usage of four EI adult learning strategies (e.g., reflective conversation, caregiver practice with feedback, collaborative problem-solving, and joint planning) by the EI service provider participants during two digitally recorded intervention visits; 2) participants' knowledge of five adult learning principles and how to apply associated EI adult learning strategies with caregivers during intervention visits; and 3) perceptions of participants about the effectiveness of the training and their abilities to foster caregiver learning during intervention visits.

#### **Research Questions**

The following three research questions were evaluated by the research study:

 Practice. Does completion of a 6-week multi-component, technology-mediated inservice training course (which includes three interactive webinars, each 1.5 hours in length, on applying adult learning principles during EI visits with caregivers of young children with disabilities, ages birth to 36 months, and three embedded support sessions, each 1.5 hours in length) and a single follow-up interview increase the usage of four EI adult learning strategies (e.g., reflective conversation, caregiver practice with feedback, collaborative problem-solving, and joint planning) by 10 inservice EI service providers, as measured by 45 minute pre- and post-training video recordings of intervention visits? (Refer to Tables 1-6 in Chapter 1 for an overview of the technology-mediated inservice training course content. See Table 17 for operational definitions of the EI adult learning strategies that were taught.)

- 2. **Knowledge Acquisition.** Does completion of a 6-week multi-component, technologymediated inservice training course on applying adult learning to EI increase inservice EI service providers' knowledge of five adult learning principles and how to apply associated EI adult learning strategies during visits with families, as measured by a 20question, multiple choice pre-posttest knowledge measure? (See Appendix A.)
- 3. **Participant Perceptions of Training Effectiveness.** What perceptions do inservice EI service providers have about the effectiveness of a multi-component, technology-mediated inservice training course which includes embedded support on their knowledge of adult learning and their abilities to foster caregiver learning during intervention visits, as measured by an investigator-developed, 12-item social validity survey, one follow-up interview with each provider two weeks following the completion of the training, and comparisons of initial and final self-assessments by participants? (See Appendices B, C, and D.)

#### **Participants and Inclusion Criteria**

Training participants included nine certified EI service providers who were currently practicing within the Infant and Toddler Connection of Virginia's EI system. The training course began with 10 participants, but following the first session, one participant withdrew from the course due to a change of employment. The nine participants who completed the course were all female and worked in a variety of professional roles. See Table 13 for more information.

## Table 13

## Participant Demographic Information

	n	%
Professional role		
Service coordinator	1	11%
Service provider	8	89%
Other	2	22%
Type of service provider		
Developmental services provider	1	11%
Developmental services provider/service coordinator	1	11%
Infant development specialist	1	11%
Physical therapist/service coordinator	1	11%
Physical therapist	1	11%
Speech-language pathologist	3	33%
Technical assistance specialist	1	11%
Professional training background		
Early childhood special education	4	44%
Speech-language pathology	3	33%
Physical therapy	2	22%
Hours worked each week		
Less than 10	1	11%
11-20	2	22%
21-39	2	22%
40 or more	4	44%
Years providing early intervention		
3-5 years	2	22%
6-10 years	2	22%
11+ years	5	56%

*Note*. Participants were able to "check all that apply" when indicating their professional role(s). Differences between what was reported for role and type of provider could be accounted for by the "Other" option under "professional role."

Participants were recruited using two email announcements circulated via a listserv targeting all service providers with current EI certifications in the Commonwealth of Virginia. Both announcements included a link to a short video about the course (created by the researcher/trainer) with information about the pre-post video requirement. The participant group included service providers from multiple disciplines (e.g., education, special education, physical therapy, occupational therapy, speech-language pathology) and service localities who met the following inclusion criteria: 1) currently certified as either EI Specialists or EI Professionals under the Infant and Toddler Connection of Virginia; 2) currently practicing EI in an Infant and Toddler Connection of Virginia system; 3) at least 18 years of age and were willing and able to give informed consent for participation in the study; 4) able to assist the researcher in gaining verbal permission to digitally record two videos of intervention visits with one child and one caregiver enrolled in the local EI program; and 5) attended and completed (or attempted to complete) all required activities as part of their participation in the research. Names of participants were not used in this study; each participant was assigned an identification number to protect his or her confidentiality.

Caregivers (and their children) participated in this study by giving their informed verbal consent for intervention visits to be digitally recorded and to have these recordings shared with the researcher. The intervention visits occurred in the family's homes; the location of the visit was determined by the caregiver and the service provider based on the needs of the child and family. Caregivers were required to be at least 18 years old and willing and able to give informed verbal consent to the researcher by phone for the video recordings to be used in the study. Children were: 1) between birth to 36 months of age, 2) currently enrolled in a local Infant and Toddler Connection of Virginia program (meaning that the child demonstrated a developmental

delay, atypical development, or a qualifying diagnosis), and 3) receiving at least one direct EI service (e.g., developmental services, physical therapy, speech therapy). The videos recorded with families were used to determine each participants' ability to use the targeted EI adult learning strategies (e.g., reflective conversation, caregiver practice with feedback, collaborative problem-solving, and joint planning). The videotapes were used as pre-training and post-training measures (dependent variable #1). They were stored on an encrypted, password-protected flash drive and backed-up on an external hard drive which was stored in a locked location for the duration of the study. Following the study, the videos were erased. No names of caregivers or children were used in this study; each video was assigned an identification number to protect the confidentiality of all adults and children shown in the videos.

#### Setting

The multi-component inservice training course was provided using web-conferencing software and teleconferencing technology, which were used to facilitate learning at a distance. Participants interacted with the trainer (who was also the researcher) and other participants using Blackboard Collaborate, a web conferencing software package which was used for the visual presentation, text chat, and whiteboard interactions (using pointers, textbox, and drawing tools), and a teleconferencing service which provided users with a toll-free telephone number for audio input sharing. Participants were able to join the training sessions from any wired or wireless location, and all chose to participate from their homes or offices. The trainer conducted the training sessions from a wired home office.

#### **Institutional Review Board Approval Process**

Prior to beginning this research project, an application was submitted to the Virginia Commonwealth University (VCU) Institutional Review Board (IRB) for review of human research. This application was submitted electronically through IRB-RAMS, VCU's submission program, for an expedited review. Following three rounds of reviews of all proposed study procedures and materials, approval was granted and the following number assigned: VCU IRB NO.: HM20007768. An authorization agreement between VCU and Old Dominion University (ODU) was approved to document that ODU would rely on VCU for IRB review of this research. This agreement was put in place because the researcher is an employee of VCU, where the research primarily took place.

An amendment was submitted to the VCU IRB prior to beginning the training course for final review of all training course session slide decks and materials. This approval was also obtained prior to the start of the course.

#### Procedures

Participants who consented to participate in this study were asked to complete a series of pre-training and post-training activities, in addition to activities that were required during the actual training. These pre- and post-training activities were designed to answer the research questions by measuring: 1) increases in the frequencies of use of four EI adult learning strategies (e.g., reflective conversation, caregiver practice with feedback, collaborative problem-solving, and joint planning) (Research Question #1), 2) changes in knowledge from pre- to post-training related to participants' knowledge of five adult learning principles and how to apply associated EI adult learning strategies during visits with families (Research Question #2), and 3) perceptions of the effectiveness of this multi-component, technology-mediated inservice training course (Research Question #3). Procedures for each condition of the study will be described next.

#### **Pre-training Activities**

Service provider participants were required to complete the following pre-training activities: 1) complete an initial phone call with the researcher to discuss training course requirements and the consent process; 2) provide a signed copy of the "Research Subject Information and Consent Form: Service Provider Participants" form; 3) coordinate a phone call between the researcher and the caregiver of the family with whom they want to record their pre-and post-training videos; 4) record and submit a 45-minute pre-training video of an intervention visit with a family; and 5) complete the pre-training knowledge measure. Each requirement will be discussed. See Table 14 for a description and schedule of pre-training activities.

Service provider participant recruitment, initial phone call, and consent. Following the email announcements about the training, service providers who were interested in the training and participating in the research were asked to email the researcher their names, type of EI certification, professional role (e.g., speech therapist, physical therapist), and name of the local Infant and Toddler Connection of Virginia system for which they were employed or contracted. The researcher responded to each email and scheduled an initial phone call with each interested service provider to discuss the training course requirements and the consent process. Consent documents were emailed to the service provider to review before the phone call. These documents included: 1) Letter to Providers about Study (Appendix F); 2) Research Subject Information and Consent Form: Service Provider Participants (Appendix G); 3) Letter to Parent about Study (Appendix H); and 4) Research Subject Information and Consent Form: Parent and Child Participants (Appendix I). A copy of a handout describing the course requirements

#### Table 14

Schedule of Pre-training Activities

Activity	Time Schedule
Email pre-training information to participants about the training	One month before first
and study, including information letters, consent forms, and	training session
specific instructions for video recording and submission	
Email link to pre-training knowledge measure to participants	One month before first
	training session
Pre-training knowledge measure is completed by participants	Before first training session
Service provider participants' consent forms are returned to	Before first training session
researcher	
Dra training videos are submitted by participants	Defore first training easien
Fre-training videos are submitted by participants	Before first training session
Orientation to webinar software and online tools is offered	One week prior to first
orientation to weblinar software and online tools is offered	training session

(Appendix J) was also sent with these documents. This handout was linked to the email announcements, but an additional copy was provided to ensure that all participants had a copy.

During the initial phone call with each service provider participant, the requirements for the videos and gaining parental verbal consent were explained. This phone call lasted between 20-45 minutes and included a detailed discussion of the components of the training course (e.g., session types, how participants would interact during the sessions, technology requirements), the course requirements, and the consent process. All service providers gave their verbal consent to participate in the training course and complete the requirements during the initial phone call. Service provider participants were then instructed to send the researcher a signed copy of the consent form and notify the researcher when they had identified a family for the videos. Service provider participants were also emailed a handout with instructions for recording their videos (Appendix K).

Parent and child recruitment, phone call, and consent. Following this initial service provider participant phone call, each participant contacted a family with whom they were working regarding their interest in collaborating on the video requirements. The service provider also shared a copy of the "Letter to Parent about Study" and the "Research Subject Information and Consent Form: Parent and Child Participants" documents with the caregiver. When a caregiver agreed, the service provider coordinated a phone call between the caregiver and the researcher so that the researcher could discuss the consent process, answer any questions, and obtain the caregiver's verbal consent for participation in the videos. This phone call occurred in one of two ways: 1) the caregiver gave permission to the service provider to share the family's phone number with the researcher, who then contacted the caregiver directly, or 2) the service provider called the researcher during an intervention visit so that the researcher and caregiver could discuss the consent process. The caregiver phone call typically lasted between 5-15 minutes, depending on how many questions the caregiver asked. All caregivers provided verbal consent to the researcher during this call. When the service provider was not present during the call, the researcher emailed the provider following the call to indicate that verbal consent was obtained and the video could be recorded.

**Pre-training video**. Each participant was required to record and submit one video of herself conducting an EI visit with a child and caregiver in a natural environment (i.e., home or other community setting) before the first training session. Videos were requested to be at least 45 minutes long and be of high visual and audio quality for coding/data analysis purposes. Service provider participants were asked to email the researcher once their pre-training video was recorded. The researcher then emailed the service provider participant instructions for uploading the video using VCU's secure file sharing system, Filelocker. An upload request email was also sent from Filelocker to each participant with a link for uploading the video. Technical support was provided by the researcher as needed to facilitate the file upload. Some videos were uploaded as single video files, while others were uploaded in as many as five segments. Once video files were uploaded, the researcher downloaded them from Filelocker within 24 hours and saved them to an encrypted flash drive. Service provider participants were notified when their video files were successfully downloaded by the researcher.

**Pre-training knowledge measure.** Following the initial phone call with the service provider participant, the researcher emailed the participant a link to the pre-training knowledge measure. The online survey site, Survey Monkey, was used to administer the pre-training knowledge measure. A unique link was sent to each participant via email so that each participant's completion of the knowledge measure could be tracked. All participants completed the pre-training knowledge measure before the first training course session.

Orientation to Blackboard Collaborate. Two weeks prior to the start of the training course, information was emailed to the service provider participant group about how to test their computer system requirements to ensure that they would be able to login to Blackboard Collaborate. One week prior to the start of the training course, an orientation to Blackboard Collaborate was facilitated for a small group of five participants (attendance at the orientation was optional). During the orientation, technical support was provided to two participants who had trouble logging in to Blackboard Collaborate. Information was provided about the interactive webinar tools that would be used during the training course sessions, including chat, the raise hand feature, and the use of white board tools such as pointers, text, and drawing tools. Participants were provided with the opportunity to use these tools during the orientation and invited to ask questions. The orientation lasted 30 minutes.

**Information about the first session**. Four days prior to the start of the training course, an email was sent to the service provider participants with information about the first session, including: 1) brief description of the content to be covered; 2) login and call-in information for accessing the session; 3) a link to an adult learning quick reference guide; and 4) an attached handout which provided information about the adult learning principles and strategies. Participants were instructed to review the link and the handout before the session.

#### **Training Activities**

A multi-component, technology-mediated inservice training course entitled, *Using Adult Learning Strategies to Support Caregivers during Early Intervention Visits*, was developed by the researcher. This training course was conducted for 9 certified EI service providers who were currently practicing in the Infant and Toddler Connection of Virginia's EI system. Training sessions occurred weekly, lasting 1.5 hours each session, over six weeks on a consistent day and at a consistent time of day each week (i.e., Wednesdays, 4:30-6:00pm). Blackboard Collaborate webinar software and teleconferencing technology was used to host the training course so that participants could participate from any location across Virginia where they had internet and phone access. Participants were asked to login and call in to weekly training sessions at least ten minutes early to ensure that technology was working and to troubleshoot any issues with the researcher. Technical assistance was provided from the researcher throughout the training to ensure participant in each session. After the first session, technical issues were minimal, including one participant who had connectivity issues and another participant who experienced occasional trouble using the whiteboard tools. The researcher/trainer met with the latter participant outside of the training session time to orient her to the whiteboard tools (as she had been unable to attend the pre-training orientation session) to ensure her participation.

The six training sessions included three interactive webinar sessions and three embedded support sessions (see Tables 1-6 in Chapter 1 for details about content and activities for each training session). Training session types alternated weekly so that each interactive webinar was followed the next week by an embedded support session during which participants discussed their application of what was learned during the previous week. All sessions were taught by the same trainer, who was also the researcher. Each interactive webinar session was facilitated using: 1) a Power Point slide deck to display target content, 2) instructional activities using discussion questions to be answered using web-based or live chat, pointers, or drawing whiteboard tools, and 3) case scenarios to illustrate the application of adult learning principles and use of EI adult learning strategies during EI visits.

Embedded support sessions were conducted using similar methods, but focused on more live chat conversation among participants as they shared their insights learned from selfassessments, readings, and experiences between training sessions. Between sessions, participants completed one to two reading assignments (depending on the training session) which were provided to participants as links to online materials (e.g. EI Strategies for Success blog posts) and as emailed attachments (e.g., journal articles when a direct link was not available). Following each interactive webinar session, participants completed a researcher-developed selfassessment (see Appendices D and E) to facilitate the participant's reflection on her understanding, use, and mastery of practices discussed in the webinar (see Chapter 1). Selfassessments were provided to participants as Microsoft Word documents via email immediately following each interactive webinar session. Participants were required to submit their initial and final self-assessments (which were then discussed during training sessions #2 and #6) by email to the researcher for later qualitative analysis. Following each embedded support session, participants worked on their plans for improvement, which were discussed during the session and included one skill each participant committed to target for improvement of professional practices related to supporting caregiver learning during the next week.

Throughout the training course, participants received verbal performance feedback to: 1) support their efforts to understand training content, 2) reflect on their own practices, 3) prepare for their next intervention visit, and 4) apply what they were learning in their work with children and families. Performance feedback was provided in response to participants' comments shared during the training to help participants address challenges, adapt their practices, and gain a deeper understanding of how to support caregiver learning. Additionally, the trainer was available to support participants between training sessions as needed by email or phone. See Table 15 for an overview and schedule of training activities. See Tables 1-6 in Chapter 1 for a detailed description of content for each training session. Descriptions of the facilitation of each training session follow.

## Table 15

# Schedule of Training Course Activities

Session Title	Trainer Activity	Participant Activity	Time Schedule
Adult learning and its application in early	Facilitate interactive webinar session	Complete assignments	Week 1
intervention		Complete and submit initial	
		self-assessment	
Self-assessment and reflection: How are you supporting	Facilitate embedded support session	Complete assignment	Week 2
caregiver learning during EI		Work on joint plan for	
visits?		improvement of professional practices	
Using EI adult learning strategies to support caregiver	Facilitate interactive webinar session	Complete assignments	Week 3
learning during the EI visit		Apply adult learning principles by using three EI adult learning strategies (e.g., reflective conversation, caregiver practice with feedback, and collaborative problem-solving) during visits with families	
		Complete self-assessment	
Self-assessment and reflection: Using EI adult learning	Facilitate embedded support session	Complete assignments	Week 4
strategies to apply adult		Work on joint plan for	
learning principles during EI visits		improvement of professional practices	

## Table 15 Continued

Session Title	Trainer Activity	Participant Activity	Time Schedule
Using EI adult learning strategies to support caregiver	Facilitate interactive webinar session	Complete assignments	Week 5
intervention between visits		Apply adult learning principles by focusing on the use of two EI adult learning strategies (e.g., collaborative problem- solving and joint planning) during visits with families	
		Complete and submit final self- assessment	
Self-assessment and reflection: How are you supporting caregiver learning now?	Facilitate embedded support session		Week 6

**Session 1**. The first training session, which was formatted as an interactive webinar, began on-time with participants introducing themselves using chat by sharing their names, role (e.g., developmental service provider, physical therapist, speech-language pathologist), location, and something they learned about their practices from recording their pre-training video. Ten participants attended this session. A colleague of the researcher/trainer also attended to monitor implementation fidelity using the Procedural Fidelity Checklist – Interactive Webinar Session. A 36-slide Power Point slide deck was used as a visual guide to the content discussed during the session, which included: 1) an overview of the mission of EI and photographs of EI visits used to review and illustrate recommended practices; 2) quotes from the EI literature describing the effectiveness of parent-implemented intervention, interventions associated with positive child and family outcomes, and capacity-building practices that facilitate active caregiver participation and learning during visits; 3) statements and illustrations of five adult learning principles, three adult learning components, and four EI adult learning strategies; 4) a brief case scenario used to facilitate discussion (in chat) about how to apply the principles, components, and strategies during an EI visit; and 5) wrap-up slides describing next steps, including a visual summary of what was learned during the session, what should be practiced before the next session (i.e., applying the adult learning principles during EI visits), and the activities to be completed by participants before the next session (i.e., complete the reading, watch the video example, and complete the first self-assessment and email it to the researcher/training by noon the following Wednesday).

Though participants listened to the session via conference call, all participant lines were muted during this session to avoid distractions from background noise on the call. Interaction with participants was facilitated using chat, pointer, and textbox whiteboard tools, in which all participants appeared to be fully engaged. Participants were referred to the handout they received before this session throughout the course as another visual reference of the content being taught and to help them apply what they were learning during the case scenario discussion. This training session ended on-time with all participants logging off the webinar software and disconnecting from the conference call line. The colleague who monitored implementation fidelity emailed the completed checklist to the researcher/trainer immediately following the session. An email with the activities to be completed before the next session was also sent to participants immediately following the end of the session.

Session 2. This session was formatted as an embedded support session and began on-time with participants typing into chat one thing they learned about themselves based on completing the initial self-assessment. Nine participants attended, as one participant notified the researcher before this session of her need to withdraw due to an impending job change. Implementation fidelity was monitored using the Procedural Fidelity Checklist – Embedded Support Session by the same colleague of the researcher/trainer who attended the first session. A 10-slide Power Point slide deck was used as a visual guide to the discussion, showing open-ended questions (e.g., "How are you supporting caregiver learning during EI visits?" and "What did you learn?") to be discussed by participants. Conference call lines were open during this session, but participants were asked to keep their lines muted when not speaking to minimize background noise.

A round-robin style of facilitation was used, allowing each participant time to verbally share her impressions of what was learned from completing the self-assessment. Participants were called-on in alphabetical order to share their insights and experiences from the previous week. The researcher-trainer provided specific feedback, asked open-ended questions to guide the participant's self-reflection, and/or asked the participant to elaborate on something she wrote on her self-assessment. Other participants were invited to respond to the speaking participant's comments either by typing in chat or by speaking; most participants chose to respond in chat. The researcher/trainer closely monitored chat comments by referencing them during the discussion and occasionally inviting a participant who typed in chat to elaborate verbally. At the end of the session, next steps were discussed including: 1) a brief summary of what was learned so far; 2) instruction to participants to work on their individual plans for improvement as described on their self-assessments and during the session; and 3) activities to complete before the next session (e.g., complete the reading). This training session ended on-time with all participants logging off the webinar software and disconnecting from the conference call line. The colleague who monitored implementation fidelity emailed the completed checklist to the researcher/training immediately following the session. An email with the activity to be completed before the next session was sent to participants the following morning.

**Session 3.** This interactive webinar session began on-time with participants typing into chat a success they experienced during the week related to what they were learning. Nine participants attended this session. Implementation fidelity continued to be monitored by the same colleague of the researcher/trainer. A 38-slide Power Point slide deck was used as visual support for the content taught, including: 1) summary of relevant findings from a literature review describing coaching strategies EI service providers use with parents of young children with disabilities; 2) in-depth discussion of how to apply the adult learning components, principles, and three of the EI adult learning strategies (i.e., reflective conversation, collaborative problemsolving, and joint planning) that most directly support caregiver learning during EI visits; 3) open-ended discussion questions to facilitate reflection about the use of these strategies among
participants; 4) case scenario describing how these strategies can be implemented during an EI visit with a family; and 5) wrap-up slides describing next steps, including a brief summary of what was learned, instructions about practice activities (i.e., applying the three EI adult learning strategies during visits to support caregiver learning), and activities to be completed before the next session (i.e., complete the reading, watch the video example, and complete a mid-course self-assessment).

The conference call lines were open during this interactive webinar in case participants wanted to verbally participate in the session. Participants were asked to keep their lines muted when not speaking to minimize background noise. With few exceptions, participants chose to interact using chat rather than verbally. Interaction with participants was facilitated using chat, pointer, and textbox whiteboard tools, in which all participants appeared to be fully engaged. This training session ended on-time with all participants logging off the webinar software and disconnecting from the conference call line. The colleague who monitored implementation fidelity emailed the completed checklist to the researcher/trainer immediately following the session. An email with the activities to be completed before the next session was sent to participants the following morning. Additional instructions were included in this email, including: 1) asking participants to come to the next embedded support session prepared to discuss something from the reading that resonated with them, and 2) requesting that participants email the researcher/trainer their mid-course self-assessment by noon the following Wednesday to use to help facilitate discussion during the next session (as referencing what individual participants noted on their self-assessments during the first embedded support session was very helpful).

**Session 4.** This embedded support session began on-time with participants typing in a success with applying what they learned during the last session. Eight participants attended this session. One participant had a family emergency and notified the researcher/trainer prior to the session, so an audio recording was made of the session and the chat log from the session was saved and sent to this participant following the session. Implementation fidelity was monitored by the same colleague of the researcher/trainer who attended the previous sessions. A 9-slide Power Point slide deck was used as a visual guide to the discussion, showing open-ended questions (e.g., "What did you learn?") to be discussed by participants. Conference call lines were open during this session, but participants were asked to keep their lines muted when not speaking to minimize background noise.

A round-robin style of facilitation was used, allowing each participant time to verbally share what resonated with her based on the reading, which described specific concepts related to adult learning that can be applied during EI visits. Participants were also encouraged to relate this information to any insights they had from completing the mid-course self-assessment. Participants were called-on in reverse alphabetical order to share their information. The researcher-trainer provided specific feedback, asked open-ended questions to guide the participant's self-reflection, and/or asked the participant to elaborate on something she wrote on her self-assessment. Other participants were invited to respond to the speaking participant's comments either by typing in chat or by speaking; most participants chose to respond in chat. The researcher/trainer closely monitored chat comments by referencing them during the discussion and occasionally inviting a participant who typed in chat to elaborate verbally. At the end of the session, next steps were discussed including: 1) a brief summary of what was learned so far; 2) instruction to participants to work on their individual plans for improvement as described on their self-assessments and during the session; and 3) activities to complete before the next session (e.g., complete the reading, continue to intentionally apply what was being learned). This training session ended on-time with all participants logging off the webinar software and disconnecting from the conference call line. The colleague who monitored implementation fidelity emailed the completed checklist to the researcher/trainer immediately following the session. An email with the activity to be completed before the next session was sent to participants the following morning.

Session 5. Due to the researcher/trainer's family emergency, the live version of this session was cancelled. A Camtasia video recording was produced by the researcher/trainer using a 29-slide Power Point slide deck to ensure that participants received the webinar content from this session. The slide deck was used as a visual guide to the content being taught, including: 1) key findings from the previously discussed literature review with emphasis on how these findings apply to supporting caregiver intervention between visits; 2) quotes from the EI literature emphasizing the value of the caregiver's interactions with the child, the caregiver's active participation in problem-solving and planning, and the importance of helping the caregiver achieve deep understanding of intervention strategies to facilitate intervention between visits; 3) in-depth discussion about adult learning components, principles, and two EI adult learning strategies (e.g., collaborative problem-solving and joint planning) most directly involved with supporting caregiver intervention between visits; 4) a case scenario illustrating how to apply these strategies during an EI visit based on reflections and input from participants; and 5) wrapup slides describing next steps, including: 1) a brief summary of what was learned; 2) instructions about practicing the EI adult learning strategies on visits that facilitate a caregiver's deeper understanding of how to use intervention strategies with the child between visits; and 3)

activities to complete before the next session (i.e., complete the readings, watch the video example, complete the final self-assessment, and compare the initial and final self-assessments for insights to be shared at the next session).

The recording of Session 5 was uploaded and stored as an unlisted video on YouTube (www.youtube.come/veipd). A link to this 35-minute video recording was emailed to participants two days after the scheduled session date, along with a Reflection Questions document with five open-ended questions (see Appendix L). The video was recorded with five pause points embedded in the video, during which viewers were instructed to pause the video and answer a reflection question on the document that corresponded to the content just covered. Participants were instructed to email the researcher/trainer their completed reflection questions document by noon the following Wednesday before the next session. Eight participants completed this assignment. Participants were also instructed (by email) to complete activities following the session, including: 1) completing two readings; 2) watching a video example; and 3) completing the final self-assessment. Participants were asked to compare their initial and final self-assessments and be prepared to share insights from this comparison during the next session.

**Session 6.** The final session of the training course was formatted as an embedded support session. Nine participants attended this session. Implementation fidelity was monitored by the same colleague of the researcher/trainer who attended the all sessions. An 11-slide Power Point slide deck was used as a visual guide to the discussion, showing open-ended questions (e.g., "How are you supporting caregiver learning during EI visits?" and "What did you learn?") to be discussed by participants. Conference call lines were open during this session, but participants were asked to keep their lines muted when not speaking to minimize background noise.

A round-robin style of facilitation was used, allowing each participant time to verbally share insights based on completing the final self-assessment and comparing it to her initial selfassessment. Participants were called-on in alphabetical order to share their information. The researcher/trainer provided specific feedback, asked open-ended questions to guide the participant's self-reflection, and/or asked the participant to elaborate on something she wrote on her self-assessments. Other participants were invited to respond to the speaking participant's comments either by typing in chat or by speaking; most participants chose to respond in chat. The researcher/trainer closely monitored chat comments by referencing them during the discussion and occasionally inviting a participant who typed in chat to elaborate verbally. At the end of the session, next steps were discussed for wrapping up participation in the research project on this training course, including instructions for: 1) completing the post-training knowledge measure; 2) completing the participant survey; 3) recording and submitting the post-training video; 4) completing the follow-up phone call interview with the researcher/trainer; and 5) receiving the certificate of completion and gift card. Participants were instructed to complete the first four wrap-up activities by the last day of the month. This training session ended on-time with all participants logging off the webinar software and disconnecting from the conference call line. The colleague who monitored implementation fidelity emailed the completed checklist to the researcher/training immediately following the session.

#### **Post-training Activities**

Following the conclusion of the multi-component, technology-mediated training course, participants will be required to complete four activities. The day after the last training session, an email was sent to participants with instructions for: 1) completing the post-training knowledge measure, 2) recording and submitted the post-training video, 3) completing the social validity (participant) survey, and 4) scheduling the individual follow-up interview. Procedures for each activity are described next.

**Knowledge measure.** Participants received a link to the post-training knowledge measure which was available via Survey Monkey online survey software. They were asked to complete the knowledge measure within three days of the date of the last training session. A unique link was sent to each participant via email so that each participant's completion of the knowledge measure could be tracked. A reminder email was sent 11 days after the original email to remind two participants who had not yet completed the knowledge measure to do so. All participants completed the post-training knowledge measure.

Video submission. Participants were required to record and submit one video of an EI visit with the same child and family from the pre-training video in a natural environment (e.g., home or other community setting such as the local park) by the end of the month (within 19 days) post-training. This video was expected to be 45 minutes in length and of high visual and audio quality for coding/data analysis purposes. Videos were submitted to the researcher via Filelocker, the password-protected file sharing site used by VCU (where the researcher/trainer was employed). Once a participant had the recording ready and notified the researcher/trainer, an upload request was sent to the participant from Filelocker. The participant then accessed Filelocker, entered a password, and uploaded her video. Some videos were uploaded as single video files, while others were uploaded in as many as four segments. Once video files were uploaded, the researcher downloaded them from Filelocker within 24 hours and saved them to an encrypted flash drive. Service provider participants were notified by email when their video files were successfully downloaded by the researcher.

**Social validity survey.** The link to the social validity (participant) survey, which was available using Survey Monkey online survey software, was sent to participants the day after the final training session. Participants received a unique link to the survey so that each participant's completion of it could be tracked. Participants were asked to complete the survey within one week post-training. A reminder email was sent 11 days after the original email to remind one participant who had not yet completed the survey to do so. All participants completed the social validity survey.

Individual follow-up interview. A follow-up interview was conducted individually with each participant within just over two weeks (19 days) post-training using teleconferencing technology. This interview allowed participants to share feedback about their participation in the training course and discuss their experiences applying what they learned in the training course. Participants were asked eight questions (see Appendix C) to facilitate the discussion and gather information. Participants also received performance feedback and support from the researcher/trainer based on their reported experiences with applying the knowledge and skills learned during the training course. Follow-up interviews were recorded and transcribed for qualitative analysis. Interviews were completed with all participants.

Upon completion of the training course, participants received a certificate documenting the professional development hours completed. Participants received a total of 15 hours (i.e., 9 hours for the training sessions, two hours for video recording, and four hours for completion of other activities before, during, and after training). All EI providers in Virginia are required to maintain a state EI certification in order to work in the Infant and Toddler Connection of Virginia system. Providers must be recertified every three years and must earn 30 professional development hours; the 15 hours earned in this training course could be used toward this state recertification. In order to receive the certificate, participants must have completed (or have attempted to complete) all requirements: 1) submit pre-post knowledge measures; 2) complete (or have attempted to complete) two video submissions, 3) attend all six training sessions, 4) submit their initial and final self-assessment forms, 5) submit the social validity survey, and 6) complete the follow-up interview. In addition, participants received a \$50 Amazon gift card as an incentive for completing all research activities. Participants were informed about the certificate and gift card incentives before the training course. See Table 16 for a description and schedule of post-training activities.

## Table 16

Schedule	of Post-	training	Activities
	./		

Activity	Time Schedule
Activity	Time Schedule
Email post-training information and links to participants,	Within 24 hours after the last
including links to knowledge measure and social validity survey	training session
and instructions for final video recording and submission	8
and instructions for final video recording and submission	
Post training knowledge measure is completed by participants	Within three days after last
1 Ost-training knowledge measure is completed by participants	within three days after last
	training session
	W7:41-1
Social validity survey is completed by participants	within one week after last
	training session
Post-training videos are submitted by participants	Within 19 days after last
	training session (by the end
	of the month)
Conduct follow-up interview session with each participant	Within 19 days after last
	training session (by the end
	of the month)
Certificates and gift cards mailed to participants	One month after last training
Continuates and fire ourds manou to participants	and month after fust training
	50551011

#### **Instruments and Materials**

Consent forms, the instruments to measure participant knowledge and participant use of EI adult learning strategies during recorded EI visits, the social validity survey, and the procedural fidelity checklists were developed by the researcher for this study. All participant materials were provided electronically as email attachments and links to online surveys. Instruments and materials for this study are described next.

## **Consent Forms for Participants**

Before the multi-component, technology-mediated, inservice training course began, written information was provided to participants about the study and expectations for participation (see Letter to Providers about Study in Appendix F). Participants were asked to sign an informed consent form (see Research Subject Information and Consent Form: Service Provider Participants in Appendix G) to document their written consent for participation in the study. Participants were also required to identify a family with whom they could apply the strategies they would learn during the training and who agreed to have two intervention visits recorded and submitted as part of the training course requirements. Participants were asked to return a signed copy of the consent form to the researcher by mail or email prior to being enrolled in the training. Copies of all signed consent forms from participants were kept in a locked file cabinet for the duration of the study.

#### Video Permission Consent for the Parent and Child

To facilitate the video recordings with families, participants were provided with a letter of information for caregivers (See Letter to Parent about Study in Appendix H) and the information and consent document (see Research Subject Information and Consent Form: Parent and Child Participants in Appendix I). Participants were instructed to identify a family with

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whom they could work for the duration of the training course and share the letter and the information and consent document with them. Once a family was identified by the participant, a phone call was scheduled with the caregiver so that the researcher could review the information in detail and answer any questions from the caregiver. After the study and video submission requirements were explained and the caregiver was offered the opportunity to ask questions, verbal consent was requested for the caregiver and child to be digitally recorded for both the pre-and post-training videos. Verbal consent was obtained from all caregivers who appeared in the videos. The dates of caregiver consent were recorded on an encrypted spreadsheet with other participant information and stored on a password-protected laptop.

## Video Coding/Data Analysis

**Video submissions.** Each participant was asked to submit two videos of EI visits (45 minutes in length) illustrating their work with one family. One video was required to be submitted before the inservice training course began and another was submitted within two weeks post training. All participants submitted or attempted to submit a pre-training video. The lengths of the videos varied between 32-60 minutes and featured the participant engaging with a caregiver and child during an EI visit. Participant 7 tried using multiple means of submitting her pre-training video, including sending it using VCU Filelocker and meeting in-person with the researcher to transfer the video file from her iPhone to the researcher's computer, but the file was corrupt and was unplayable. Because of this, only nine participants successfully submitted a pre-training video.

Regarding the post-training requirement, only five participants were successful in submitting a video. The same participant whose pre-training video was corrupt attempted to record and submit a post-training video, but this file was also corrupt and could not be played.

Three other participants (i.e., Participants 2, 3, and 4) were unable to submit a post-training video due to the children's illness and/or hospitalization. Participant 9 submitted a post-training video with a different family because the family shown in the pre-training video unexpectedly left the EI program during the training course. Post-training videos varied in length from 38-72 minutes.

**Preparation of videos for coding.** In total, there were five pre-post video submission pairs that were used for data collection. Due to the variety of video lengths, all videos were copied to a new video file and edited down to 32 minutes in length, to match the shortest video submitted. As much as possible, content was deleted from the beginning of each video to preserve the joint planning that typically occurs at the end of an EI visit. Each decision was made on a case-by-case basis to preserve the most essential aspects of the caregiver-service provider interactions. The breakdown of what was deleted from each video is reported in Chapter 4.

**Coding procedures.** Pre- and post-training videos were coded randomly following the completion of the training course. Coders were not aware of which videos were submitted pre-training or which were submitted post-training when they coded the digital recordings. Additionally, the coders, training course participants, and the families were kept blind to the research questions. A 30-second interval coding system was used to record the occurrence of the four EI adult learning strategies (e.g., reflective conversation, caregiver practice with feedback, collaborative problem-solving, and joint planning) during each interval. Coders scored the occurrence of each of the four strategies during each 30-second interval using the operational definitions described in Table 17. Each 30-second interval was followed by a 5-second break to record data. Total frequency of occurrence for each target EI adult learning strategy was calculated for each video. Total frequencies of strategy occurrence and nonoccurrence were compared across video submissions to measure if there were increases in the frequencies of use

of the EI adult learning strategies from pre- to post-training. Differences were reported in terms of the increase or decrease in number of occurrences of using the EI adult learning strategies, by participant, from pre- to post-training. To increase chances of gaining a high level of interrater reliability, the coding was divided into two, 16-minute coding sessions per video. A two minute break was provided between the two segments. A time recording stamp was used to ensure that coders were coding the exact same segments of each video recording. Coding occurred in the same room with the coders separated so the two coders were not influenced by one another. The total interrater reliability was determined for each coding session by participant as well as for all participants at the conclusion of coding. See Appendix M for the video coding data sheet.

# Table 17

Operational Definitions for EI Adult Learning Strategies Taught during the Technology-mediated, Inservice Training Course and Coded from Participants' Pre- and Post-training Videos

Adult Learning	EI Adult Learning	Definition	Example	Non-Example
Principle	Strategy		-	-
Adult learning principle #1: Adults learn best when what is being learned is immediately	Reflective conversation (RC)	Service provider asks caregiver an open-ended question to gain information about the caregiver's prior knowledge about or	Provider: "What have you already tried to help Ella learn to feed herself?"	Caregiver mentions routine or activity and service provider immediately gives suggestions.
relevant and useful to them		experience with a target routine, activity or problem and its	Caregiver: "I've tried different spoons but she still	No open-ended questions are used by service provider.
Adult learning principle #2: Adults learn best when new knowledge is built on prior		life. Examples: What have you already tried? What do you already know about?	spills most of her food before it gets to her mouth."	Service provider initiates RC but the parent does not answer.
knowledge		RC includes a minimum of one verbal exchange between the caregiver and the service provider.		
		When RC begins during one interval and ends during the next interval, RC is coded for the second interval.		
	Adult Learning Principle Adult learning principle #1: Adults learn best when what is being learned is immediately relevant and useful to them Adult learning principle #2: Adults learn best when new knowledge is built on prior knowledge	Adult Learning PrincipleEI Adult Learning StrategyAdult learning principle #1: Adults learn best when what is being learned is immediately relevant and useful to themReflective conversation (RC)Adult learning principle #2: Adults learn best when new knowledge is built on prior knowledgeNew Strategy	Adult Learning PrincipleEI Adult Learning StrategyDefinitionAdult learning principle #1: Adults learn best when what is being learned is immediately relevant and useful to themReflective conversation (RC)Service provider asks caregiver an open-ended question to gain information about the caregiver's prior knowledge about or experience with a target routine, activity or problem and itsAdult learning principle #2: Adults learn best when new knowledge is built on prior knowledgeService provider asks caregiver's prior knowledge is built on prior knowledgeRC includes a minimum of one verbal exchange between the caregiver and the service provider.RC includes a minimum of one verbal exchange between the caregiver and the service provider.	Adult Learning PrincipleEI Adult Learning StrategyDefinitionExampleAdult learning principle #1:Reflective conversation (RC)Service provider asks caregiver an open-ended question to gain information about the information about the caregiver's prior knowledge about or experience with a target routine, activity or problem and its relevance to everyday life. Examples: What have you already tried to help Ella learn to feed herself?"Adult learning principle #2:Caregiver's prior knowledge is built on prior knowledgeCaregiver: "I've tried different spons but she still spills most of her food before it gets to her mouth."Adult learning principle #2:RC includes a minimum of one verbal exchange between the caregiver and the service provider.MowledgeRC includes a minimum of one verbal exchange between the caregiver and the service provider.When RC begins during one interval and ends during the next interval, RC is coded for the second interval.

Adult Learning Component	Adult Learning Principle	EI Adult Learning Strategy	Definition	Example	Non-Example
			A new RC is coded when a new routine, activity, or problem is discussed.		
Application	Adult learning principle #3: Adults learn best through active participation and practice Adult learning principle #4: Adults learn and remember most successfully when what they are learning is practiced in context and in real time Adult learning principle #5: Adult learners want feedback on their learning and performance	Caregiver practice with feedback (CPF)	Caregiver practices using an intervention strategy by engaging the child while the service provider observes. Service provider shares at least one specific instructional or affirmative feedback statement during or following the practice episode about the caregiver-child interaction or the child's response. CPF includes a minimum of one practice opportunity and one specific verbal feedback statement. When CPF begins during one interval and	Caregiver takes her daughter's hand to help her scoop food on a spoon and bring the spoon to her daughter's mouth for self- feeding. Service provider praises the mother's efforts by saying "I like how you helped her scoop her mashed potatoes. She hardly spilled any food this time."	Service provider interacts/models with child while caregiver observes. Caregiver and service provider talk about using an intervention strategy without practicing it. Caregiver practices using targeted intervention strategy but service provider does not provide any feedback. Service provider provides general feedback like "good job" or "nice"

Adult Learning	Adult Learning	EI Adult Learning	Definition	Example	Non-Example
Component	Principle	Strategy		1	Ĩ
			ends during the next interval, CPF is coded for the second interval.		commenting on the caregiver-child interaction or the child's response.
			A new CPF is coded when a new episode of caregiver practice begins following the previous feedback statement (e.g., caregiver helps Ella scoop her food, receives feedback from provider [first CPF], then uses the intervention strategy to help Ella take another bite, following by another feedback statement [second CPF]).		
Deep understanding	Adult learning principle #5: Adult learners want feedback on their learning and performance	Collaborative problem-solving (CPS)	The service provider or caregiver shares a challenge or wonders about how to use an intervention strategy differently. Then, they problem-solve together	Caregiver: "She seems to resist me when I try to help her get the spoon to her mouth. I think she wants to do it herself.	Service provider tells the caregiver what to do to "solve" a problem without asking for the caregiver's ideas first.

Adult Learning	Adult Learning	EI Adult Learning	Definition	Example	Non-Example
Component	Principle	Strategy			
			how the caregiver will use an intervention strategy differently or more successfully during the next attempt	Provider: "What could you do differently to make Ella feel more like she's feeding	Caregiver mentions a problem but it is not addressed by the service provider.
			or a future attempt.	herself?"	Service provider initiates CPS but the
			CPS may focus on immediate use of the	OR	parent does not reply.
			strategy and/or use	Provider: "I noticed	I J
			during other routines or activities.	that Ella is pushing your hand away. What could you do	
			CPS includes a minimum of one verbal exchange between the caregiver and service provider. CPS can be	to help her get comfortable with you holding her hand?"	
			initiated by either person.	Caregiver: "I guess I could sit behind her next time so that	
			When CPS begins during one interval and ends during the next interval, CPS is coded for the second interval.	she sees herself doing the work."	

Adult Learning Component	Adult Learning Principle	EI Adult Learning Strategy	Definition	Example	Non-Example
Component	Principle	Strategy Joint planning (JP)	Service provider and caregiver discuss a specific plan for how the caregiver will use an intervention strategy between visits. Example: How will you use the strategy you learned today? What would you like to work on during the week? JP includes a minimum	Provider: "How will you help Ella feed herself after our visit today?" Caregiver: "I feed her every meal so I can remember to sit behind her each time. We will start by practicing tonight at dinner."	Service provider prescribes activities for the caregiver to do between visits without asking for the caregiver's input. Visit ends with no discussion of what the caregiver will do with the child between visits.
			of one verbal exchange between the caregiver and service provider regarding a plan for using the strategy during the week when the service provider will not be present.		

*Note:* Adult learning principles were adapted from Trivette et al. (2009). Operational definitions for EI adult learning strategies were adapted from coaching strategies described by Freidman et al. (2012) and Rush and Shelden (2011).

## **Pre-post Knowledge Measure**

Participant knowledge was assessed pre- and post-training using a knowledge measure developed by the researcher. The knowledge measure included four demographic items and twenty multiple choice items to assess participants' knowledge of training course content. Demographic items recorded participants': 1) professional role, 2) professional background or discipline, 3) current number of hours worked each week, and 4) years of experience providing EI. Multiple choice items assessed participants' knowledge of adult learning principles, components, and EI adult learning strategies to support caregiver learning during and between EI visits. Multiple choice items were shuffled on the post-training knowledge measure to avoid possible testing effects since participants took the post-training knowledge measure shortly after completing the last training session and within two months of completing the pre-training knowledge measure. The post-training knowledge measure was administered using Survey Monkey online survey software and each measure was linked to the participant's email address to ensure that a measure was collected from each participant. See Appendix A to review the preposttest knowledge measure.

### **Self-assessment Forms**

Following each interactive webinar, participants were asked to complete a selfassessment form to prepare for the next embedded support session. Each self-assessment form was developed by the researcher to help participants reflect on their current practices related to supporting caregiver learning during EI visits and applying adult learning principles in their work with families. Two self-assessment forms were used. One form was used in preparation for the first and final embedded support sessions (sessions #2 and #6) as a reflection exercise that would allow participants to examine changes in their self-assessments at the beginning and end of training (see form in Appendix D). Before embedded support sessions #2 and #6, participants rated 12 practice statements using a Likert-style rating system to indicate how often they implemented the practices in their work with caregivers and children. One additional selfassessment form was used to prepare for embedded support session #4 to facilitate reflection on applying the five adult learning principles described in Chapter 1 (see form in Appendix E). Participants used these forms to rate between six and twelve practice statements using a Likertstyle rating system to indicate how often they implemented the practices, which were associated with adult learning principles, in their work with families. These forms also included space for participants to describe their personal strengths and challenges related to implementing the adult learning principles and strategies as well as their plan for improving their professional practices. All self-assessment forms were completed by participants as assignments between sessions. Participants were invited to summarize their reflections based on these forms during each embedded support session. Only the initial and final self-assessments were analyzed for this research project as they offered a self-reporting measure of the participants' perceptions of changes in their own practices from early in the training course and late in the course.

## **Social Validity**

Social validity of the multi-component, technology-mediated inservice training course was measured using three methods: 1) analysis of a social validity survey (see Appendix B), 2) analysis of a single follow-up interview (see Appendix C) with each participant, and 3) analysis of the initial and final self-assessments from participants (see Appendix D). The 12-item social validity survey, which was available following the training course, solicited feedback from participants about: 1) their perceptions of their level of knowledge about adult learning before and after the training course, 2) their use of the online tools, 3) the length of the training course, 4) how they will use what they learned, 5) their previous experience with web-based training, 6) their perceptions of this training course, 7) the ease of accessing tools used in the training course, and 8) any other feedback they would like to share. The survey included five multiple choice items and two yes/no items (some items included comment boxes to solicit further information), two open-ended items, and three Likert-scale items. The survey was formatted using Survey Monkey online software which produced a survey link that was emailed to participants immediately following the training course.

To gain additional data regarding the social validity of the proposed research, a follow-up interview was conducted with each participant within 19 days post-training. This interview was conducted by phone and provided the participant with an opportunity to share detailed feedback about the training course. Participants' experiences with applying what they learned in the training course during EI visits with families occurring since the conclusion of the training course were also discussed. Eight questions were asked to examine participants': 1) experiences as learners during the training course; 2) self-assessments of their own participation during the interactive webinars; 3) self-assessments of their own participation during the embedded support sessions; 4) experiences trying to apply what they learned between training sessions; 5) experiences with the self-assessment exercises during the training course; 6) perceptions of what was learned from the video recordings; and 7) beliefs about the use of skills learned during training in their work with families. The final item on the interview invited participants to share any additional feedback about their experience with the training course. Answers to each question were analyzed for themes across participants, which were then summarized to provide qualitative information about the learner experience.

Themes were also examined across participants' answers on the initial and final selfassessments, as an additional measure of social validity. Participants completed and submitted the initial self-assessment form during Week 1 of the training course in preparation for the embedded support session in Week 2. Participants completed and submitted the final selfassessment form during Week 5 of the training course in preparation for the embedded support session in Week 6. Responses were compared across initial and final self-assessment forms and across participants to examine their perceptions of changes in their practices between the start and end of the training course. This qualitative analysis was compared to the quantitative analysis of the pre-post video recordings of intervention visits (e.g., video coding of occurrence of the use of the four EI adult learning strategies) to determine if participant perceptions matched or did not match their actual practices demonstrated on the video recordings.

Further, the pre-post knowledge measure and two of the social validity measures (i.e., social validity survey and follow-up interview questions) were reviewed by two experts in the EI field and a program evaluator with knowledge of the topics prior to the beginning of the study to ensure that these measures evaluated what they were intended to measure. Both EI experts had more than 25 years of experience as EI service providers, supervisors, and professional development providers. The program evaluator had over 30 years of experience in conducting research and program evaluation for government, academic, and non-profit organizations. All experts were employed by Virginia's University Center for Excellence in Developmental Disabilities (UCEDD), the Partnership for People with Disabilities, at VCU. Reliability of the pre-post knowledge measure was monitored using a test-retest method with the order of test items shuffled on the posttest.

## **Implementation Fidelity**

Procedural fidelity was monitored using two fidelity checklists, which were coded by an observer during each interactive webinar session and each embedded support session. Each checklist was used to code the occurrence or nonoccurrence of target procedures and any comments from the observer. See Appendix N for the procedural fidelity checklist for the interactive webinar sessions and Appendix O for the procedural fidelity checklist for the embedded support sessions. Both fidelity checklists were developed by the researcher.

#### **Interrater Reliability**

Two graduate students were trained to code the videos. They were trained for three, 1.5hour sessions using a video sample of 32 minutes of an intervention visit of a service provider, child, and caregiver. These coders continued training until they met a point-by-point agreement for all target EI adult learning behaviors to a minimum level of 85% agreement. All videos were coded at the conclusion of the training course, after post-training videos had been submitted by participants. Coders were not aware of which videos were pre- or post-recordings to avoid influencing their expectations of video contents. Coding data was maintained in an excel file. Coding results were monitored at each coding session and interrater reliability was calculated for 100% of video recordings. If interrater reliability percentages fell below the target level of 85% agreement, retraining occurred. The retraining followed the same protocol as the initial interrater reliability training.

#### **Summary of Data Analysis Plan**

Data gathered for this research was analyzed primarily using descriptive statistics and a paired samples *t*-test due to the small sample size. Each participant was assigned a code number as an identifier during the study. All data, including this identification number, were maintained

using an encrypted excel spreadsheet, which was used for the *t*-test analysis and calculating the percentages of responses on each dependent variable. To answer Research Question #1, data from each pre- and post-training video recordings were coded for the occurrence of the four target behaviors: 1) reflective conversation, 2) caregiver practice with feedback, 3) collaborative problem-solving, and 4) joint planning, during 30-second intervals for the entire intervention visit video. The total frequency of occurrence of each behavior was calculated for each video then compared across pre-post video recordings to measure changes in frequencies.

Similarly, to answer Research Question #2, the percentage of items correct was compared across pre-post knowledge measures (see Appendix A) to determine knowledge before and after the training course. This data was also analyzed using a paired sample *t*-test to determine if any statistical differences could be detected between the participant group's scores before and after the training course. An item-by-item analysis was conducted on the pre- and posttests to determine if there were any patterns across items related to participants' responses regarding their knowledge of the training content which may have influenced their response.

To answer Research Question #3, social validity was measured by responses on the social validity survey (see Appendix B), the follow-up interview (see Appendix C) with each participant, and the initial and final self-assessments (see Appendix D). Survey results and results of the self-assessments were reported by the percent of participants who responded to each survey item or level of the Likert scale for items using Likert scales. Qualitative methods were used to analyze answers to the open-ended questions on the survey and the follow-up interview. Thematic analysis was used to uncover any patterns across answers, which provided information about participants' experiences with learning via these training methods and applying what they learned in their work with infants, toddlers and their families. Visual

representations of these data were examined for patterns as well. Social validity information from the self-assessments was compared to the results of the video coding to determine any similarities or differences between participants' perceptions of their practices and the actual practices they demonstrated in the pre- and post-training videos.

### Limitations

This study, as originally proposed, had some limitations which need to be addressed. First, participants came from a convenience sample of those who chose to participate in the inservice training course and in the study. The study would be stronger if the participant sample was randomly selected from the total population of EI service providers in Virginia. It is possible that participants who engaged in these activities and completed the requirements may have a different motivation or different knowledge or experience than those who did not participant or complete this activities. Second, participants selected the families with whom they collaborated for this research project from among those on their caseloads. This ability to choose the family may have resulted in a biased sample of families that may not be representative of the total population of families whose children are enrolled in EI. Third, participants chose which videos to submit for the pre and post-training submissions. It would be fair to assume that the selected videos would be what each participant viewed as his or her "best work," even though this concept was never mentioned. Fourth, families who consented to being video recorded could also be different from other families enrolled in EI. Fifth, the sample size of participants was intentionally kept small. This was an intentional decision to help manage the training course activities, to foster positive learning outcomes for the participants, and to follow guidance on best practices in adult learning offered by Dunst (2015). However, having a small sample limits the external validity of the findings (Leedy & Ormrod, 2013) and may limit the ability to detect

statistically significant differences in knowledge between the pre- and post-training knowledge measures.

Two additional limitations involved participant self-selection and research bias. Although participants were recruited from across the Commonwealth of Virginia, it is possible that participants who self-selected to participate in the training course may not be representative of service providers across the Commonwealth. Also, it may be difficult to generalize findings to the larger population of EI service providers in the Commonwealth. Finally, the researcher was the course trainer, which introduced researcher bias to the study. The researcher's access to the participant sample and the technology used to facilitate the training course was a function of her employment within Virginia's comprehensive system of personnel development (CSPD). This access (to technology and to the listserv used to access interested, certified participants in Virginia) would not have been available for another researcher outside of the state's CSPD. These limitations will be further addressed in Chapter 5.

The internal validity of study measures may also be a limitation. The development of course content and organization, the course knowledge measure, the social validity survey, and the self-assessments were not piloted before the study. It is possible that the behaviors measured using only two videos per service provider participant may not have been an accurate representation of the participant's actual practices. Additional video samples of each participant's work would likely yield a more accurate picture of his or her use of the coaching strategies learned in the training course. However, when a group of experienced EI professionals with knowledge of service providers across the Commonwealth were asked about adding additional video submissions to the training course requirements, they unanimously agreed that adding another submission would increase the burden on participants and very likely reduce the

number of service providers who were willing to participate. A final possible limitation related to recording the videos was the awareness of being recorded. This awareness may also change the behaviors of the participant, also potentially limiting the ability to know if what was being measured was accurate to real world application of the learned information.

### Conclusion

It has been reported that training participants remember very little from a single workshop or conference session without follow-up support (Snyder et al., 2011). For that reason, this case study research attempted to increase the likelihood of participants remembering and using what they learned by developing and facilitating a multi-component, technology-mediated inservice training course which was provided across time (i.e., six weeks) and included support embedded in the training course (e.g., embedded support sessions) as well as after the training (e.g., follow-up interview) which facilitated participants' self-assessment and reflection on their own mastery of learned skills. Changes in knowledge and practices were examined using multiple methods, including measurement of implementation of the new skills and knowledge in actual practice with children and families. To address the need in the field for professional development research examining the relationship between training content and actual practice, this study employed pre- and post-training video measures. These video measures focused on the application of participant knowledge at the level of implementation during intervention visits with families before and after training to determine whether or not this training course actually impacted EI practice, not merely knowledge or participants' perceptions alone.

The research project also examined the utility of providing an in-service training course that was widely available to its intended audience and followed best practices in adult learning (Dunst, 2015). By using a technology-mediated format, travel limitations were eliminated making the content available to more service providers who needed it. The training course was unique in that it provided participants with multiple opportunities to learn about evidence-based EI practices from both the researcher/trainer and peers. Using distance technology and selfassessments, participants reflected on their actual practices during and between sessions and received performance feedback following immediate application of what was being learned. Multiple opportunities for reflection, self-assessment, and feedback from the trainer and from others in the training course were expected to help participants apply what they were learning. It was intended that these activities would guide participants to achieve a deeper understanding so that they could generalize their new knowledge and skills.

It was the intended purpose of this research to evaluate the implementation of a new method of providing EI professional development to inservice practitioners in Virginia. The outcomes of this type of inservice EI professional development will add to the literature by offering states' comprehensive systems of personnel development (as well as trainers in other fields) a new method of providing inservice training that is grounded in recommended professional development practices for adult learners. This new method of professional development may have a greater reach than a single workshop, and allows participants to apply and reflect on what they are learning during and after the training experience.

#### **CHAPTER 4**

## RESULTS

#### **Chapter Overview**

To address the need for research on technology-mediated professional development in the early intervention (EI) field, a multi-component, technology-mediated inservice training course was developed, delivered, and evaluated to determine the effects of participation on participants' professional practices, knowledge acquisition, and perceptions of training effectiveness. The training course was delivered to a small group of nine EI service providers in Virginia during a 6-week period. Data was gathered before, during, and after the training course in order to answer the following three research questions:

- 1. Practice. Does completion of a 6-week multi-component, technology-mediated inservice training course (which includes three interactive webinars, each 1.5 hours in length, on applying adult learning principles during EI visits with caregivers of young children with disabilities, ages birth to 36 months, and three embedded support sessions, each 1.5 hours in length) and a single follow-up interview increase the usage of four EI adult learning strategies (e.g., reflective conversation, caregiver practice with feedback, collaborative problem-solving, and joint planning) by 10 inservice EI service providers, as measured by 45 minute pre- and post-training video recorded intervention visits? (See Tables 1-6 in Chapter 1 for an overview of the technology-mediated inservice training course content. See Table 17 in Chapter 3 for operational definitions of the EI adult learning strategies.)
- 2. **Knowledge Acquisition.** Does completion of a 6-week multi-component, technologymediated inservice training course on applying adult learning to EI increase inservice EI service providers' knowledge of five adult learning principles and how to apply

associated EI adult learning strategies during visits with families, as measured by a 20question pre-posttest knowledge measure? (See Appendix A.)

3. Participant Perceptions of Training Effectiveness. What perceptions do inservice EI service providers have about the effectiveness of a multi-component, technologymediated inservice training course which includes embedded support on their knowledge of adult learning and their abilities to foster caregiver learning during intervention visits, as measured by an investigator-developed, 12-item social validity survey, one follow-up interview with each provider two weeks following the completion of the training, and comparisons of initial and final self-assessments by participants? (See Appendices B, C, and D.)

This chapter will describe the results of the data analysis for these three research questions.

#### Introduction

Historically, inservice professional development in the EI field has been primarily provided via single workshops and conference sessions with insufficient or no implementation support during or after the training (Snyder, Hemmeter, & McLaughlin, 2011). These methods of professional development are not aligned with evidence-based recommendations for how to provide training that facilitates adult learners' acquisition of knowledge and skills that they will continue to use after training is over (Dunst, 2015; National Professional Development Center on Inclusion, 2008; Trivette, Dunst, Hamby, & O'Herin, 2009). This is important because many service providers (e.g., educators, physical therapists, occupational therapists, speech-language pathologists) enter the field without adequate training in EI at the pre-service level. They often have minimal preservice instruction in how to support caregivers of infants and toddlers with development delays or disabilities in ways that match the field's evidence-based practices (Broggi & Sabatelli, 2010; Campbell & Coletti, 2013; Catalino, Chiarello, Long, & Weaver, 2015; Kyzar et al., 2014; Sawyer & Campbell, 2012; Stremel & Campbell, 2007). These practices require that service providers engage caregivers in ways that build the caregiver's capacity to facilitate the child's development during daily routines and activities, both during and between EI visits (Workgroup on Principles and Practices in Natural Environments, 2008). Service providers who are currently working in the EI field must often gain this knowledge and the skills to implement it after they have entered the field. Therefore, making high quality inservice professional development available that increases their knowledge and supports them as they reflect on and apply what they learn should be a priority of each state's comprehensive system of personnel development (CSPD) to ensure that children and families in EI receive the most effective supports and services possible.

This research was conducted to determine the effectiveness of a new method of inservice professional development for EI service providers in Virginia. This new method was multicomponent in nature, meaning that the training included multiple means of engaging and supporting participants in their knowledge acquisition and implementation of what they were learning. Participants in the training gained knowledge about adult learning principles and components, and EI adult learning strategies that could be used to support caregiver learning, during three technology-mediated webinars. These webinars were interactive, allowing for many opportunities for participants to engage in chat discussion or use other whiteboard tools to reflect on their prior knowledge and experiences. Participants also engaged in three embedded support sessions, which alternated with the interactive webinars, so that each webinar was followed by an embedded support session the next week. During these embedded support sessions, participants received support and feedback on their self-assessment of their use of the strategies they learned and their attempts to implement what they were learning with the real families with whom they worked. This combination of session types was designed to provide ongoing support by helping participants apply what they were learning immediately, during the training course, and receive feedback on that application. This level of ongoing support was intended to facilitate a deeper understanding of participants' own practices and why supporting caregiver learning was important. This approach to inservice professional development was designed to align with Dunst's (2015) seven key features of evidence-informed inservice professional development model, which emphasizes the importance of active participation during training and providing ongoing support both during and after training.

Ongoing support was also provided to participants after the training during a single follow-up interview. The interview was conducted to gather participants' feedback about the training course and facilitate their reflection on their participation and their continued efforts to use what they learned. The interview was structured with eight guiding questions or statements. It was conducted as a conversation so that support could be provided when a success or challenge with implementing the EI adult learning strategies was shared or a question about the knowledge gained during the training course was mentioned by the participant.

It was hypothesized that facilitating an accessible, professional development activity that was intentionally designed to provide ongoing support both immediately during the training and afterwards would enhance participants' knowledge of and abilities to implement evidence-based strategies that support caregiver learning during EI visits. The professional development activity developed for this research project, entitled *Using Adult Learning Strategies to Support Caregiver Learning during Early Intervention Visits*, was facilitated using principles of adult learning both in the design of the training course and in the content delivered to participants. The training course was grounded in current recommendations for high quality, evidence-informed professional development (NPDCI, 2008; Dunst, 2015), was brief in nature, required minimal staff involvement, and promoted participants' self-reflection and practice during the training. What follows is an in depth analysis of the data collected during this research project in order to examine the effectiveness of this professional development method.

## **Data Analysis**

Data triangulation was used to examine the training course's effectiveness from multiple sources. To answer Research Question #1, participants were required to submit a video of an intervention visit before the first training course session and another video after the conclusion of the course. These pre- and post-training videos were then coded to determine if there were any increases in the frequency of use of the four EI adult learning strategies (e.g., reflective conversation, caregiver practice with feedback, collaborative problem-solving, and joint planning) taught during the course. Similarly, to answer Research Question #2, participants completed a pre- and post-training knowledge measure (via online survey software) to determine any changes in knowledge associated with completing the training course. A paired samples ttest was used to compare the data from the pre- and posttests and effect sizes were calculated using Cohen's d to determine whether any changes in knowledge were meaningful. Finally, to answer Research Question #3, participant perceptions of the effectiveness of the training course were examined by a triangulation of qualitative data, including: 1) an analysis of feedback from participants on the social validity survey; 2) a thematic analysis of feedback provided during the final interviews with participants; and 3) a comparison of initial and final self-assessments (see Appendices D and E) submitted by participants during the training course. Results of these analyses follow.

### **Practice: Frequency of Use of EI Adult Learning Strategies**

To answer Research Question 1, participants were asked to submit two videos of intervention visits featuring themselves working with a caregiver and child who were enrolled in their local EI program. The first video was required to be submitted before the first training course session in order to provide an example of their practices before taking the course. The second video was required to be recorded and submitted after the last session. Participants were asked to record both videos with the same family and to attempt to record videos at least 45 minutes in length. The shortest video submitted was 32 minutes in length, so all pre-training and post-training videos were edited to match this length, requiring that video content was deleted from all but one of them. Information about how each video was edited follows:

*Video 1.* Participant 2 submitted this video as her pre-training video. The video was submitted in four segments which totaled 32 minutes in length so no deletions were made.

*Video 2.* Participant 5 submitted this video as her post-training video. This video was submitted in two segments, totaling 53 minutes in length. Three minutes were deleted from the beginning of the first segment during which the camera was being positioned while the caregiver moved in and out of the frame. An additional 29 minutes were deleted from the end of the second video segment/end of the video because the child was mostly out of the view of the caregiver and the camera so caregiver-child interaction was minimal.

*Video 3.* Participant 8 submitted this video as her pre-training video. The video was submitted as one segment which was 39 minutes long. Seven minutes were deleted from the beginning of the video.

*Video 4*. Participant 10 submitted this video as her post-training video. The video was submitted as two segments, totaling 38 minutes in length. The first video segment, which

included six minutes and 47 seconds of the beginning of the EI visit, was deleted. An additional two minutes and 30 seconds was deleted from the beginning of the second segment.

*Video 5.* Participant 5 submitted this video as her pre-training video. The video was submitted in three segments totaling 64 minutes in length. Four minutes and 24 seconds were deleted from the beginning of the video as no people were in the frame during this time. An additional 17 minutes and 11 seconds were deleted from the end of the video because the caregiver and child were often not in view as they were preparing to leave home. During this time, the participant was writing her contact note in the room by herself.

*Video 6.* Participant 10 submitted this video as her pre-training video. Only one video segment was submitted at 47 minutes in length. Fifteen minutes were deleted from the beginning of this video.

*Video* 7. Participant 2 submitted this video as her post-training video. This video was submitted as a single segment at 72 minutes in length. Thirty seconds were deleted from the beginning of the video which showed the camera being set up. An additional 45 minutes were deleted from the end of the video because it was very difficult to see what was happening and the participant, caregiver, and child were out of view most of the time.

*Video 8.* Participant 9 submitted this video as her pre-training video. This video was submitted in two segments totaling 46 minutes in length. Twenty four minutes were deleted from the beginning of the first video segment.

*Video 9*. Participant 8 submitted this video as her post-training video. This video was submitted as one segment totaling 52 minutes in length. Twenty minutes were deleted from the beginning of the video.

*Video 10.* Participant 9 submitted this video as her post-training video. This video was submitted as two segments at a total length of 48 minutes. The first segment, which was six minutes and 47 seconds in length, was deleted. An additional nine minutes and ten seconds were deleted from the second segment, so that a total of 16 minutes were deleted from the beginning of the video.

In total, eight participants (n = 8, 89%) successfully submitted pre-training videos. One participant recorded and attempted to submit her pre-training video but after multiple attempts, it was determined that her video file was corrupt and unplayable. Five participants (n = 5, 56%) were successful with recording and submitting post-training videos. Four participants were unable to submit post-training videos due to technical issues and extenuating circumstances with the families (e.g., child illness). Therefore, at the conclusion of the study, data from five pre-post video pairs (n = 5, 56%) were coded and analyzed to answer Research Question 1.

**Interrater reliability.** Videos were randomly coded by two graduate students who were blind to the research questions. Both coders were trained to identify the occurrence, or use, of each of the target EI adult learning strategies (e.g., reflective conversation, caregiver practice with feedback, collaborative problem-solving, joint reflection) by the service provider. The training was conducted by the researcher/trainer using a sample 32-minute video of an intervention visit. The interrater reliability coders were trained using a 30-second interval coding system, meaning that during coding, the video was paused after each 30-second interval so that coders could mark the occurrence of the strategies. During training, coders reached an interrater reliability level of 85% after three 90-minute training sessions.

Once coding of videos from participants began, the same 30-second interval coding system was used. Videos were paused after each 30-second interval so that coders could mark the occurrence of the strategies on their video coding data sheet (see Appendix M). To control for unconscious biases, coders were kept blind to the type of video they were coding. That is, they did not know if they were coding a pre-training or a post-training video. Interrater reliability was calculated on 100% of videos immediately following each coding session. Reliability was calculated as the percentage of agreement for each video using this formula: total number of coding agreements/agreements plus disagreements (Friedman et al., 2012). The coders required retraining on only two videos in order to maintain their reliability. Interrater reliability ranged from 86-100% across all ten videos, with a mean of 94%.

Analysis of pre-training and post-training videos. Information about each participant and her attempts to submit videos will be discussed. (See Table 13 in Chapter 3 for additional demographic information about participants.) Results of the video analyses will be described for each participant in terms of the frequencies of use of the four EI adult learning strategies, before and after training. Then, these results will be compared across all participants.

*Participant 1.* Participant 1 was a physical therapist and clinical supervisor with 11+ years of experience as an early interventionist. For both videos, she recorded intervention visits with the same caregiver and child. On her pre-training video, Participant 1 demonstrated 10 occurrences of the target strategies, including six occurrences of reflective conversation, one occurrence of caregiver practice with feedback, and three occurrences of collaborative problemsolving. No joint planning was demonstrated during the pre-training video. This video was 32 minutes in length so no editing was required. On the post-training video, an increase in the total frequency of use of the EI adult learning strategies was exhibited (see Figure 1). She used 13 strategies during this session, including eight occurrences of reflective conversation, one occurrence of caregiver practice with feedback, four occurrences of reflective problem-
solving, and no occurrences of joint planning. It should be noted that the last 45 minutes of this participant's post-training video were deleted in order to reach the 32-minute limit; deleting content from the end instead of the beginning of the video was done because the participant and caregiver were out of view of the camera for most of this time. It is possible that joint planning, which typically occurs toward the end of a visit, did occur but was not seen during analysis. Otherwise, Participant 1's strategy use was generally consistent across videos, showing the most frequent uses of reflective conversation and collaborative problem-solving. Her total frequency of use of the EI adult learning strategies increased by three occurrences from pre- to post-training, with increases noted in the use of reflective conversation and collaborative problem-solving. This represented a 30% increase in this participant's total usage of the EI adult learning strategies.



*Figure 1*. Changes in the frequency of occurrence of the use of four EI adult learning strategies from pre- and post-training videos for Participant 1.

*Participant 2.* Participant 2 was a developmental services provider who also mentored and trained other staff in her local program. She had a background in early childhood special education with 3-5 years of EI experience. Participant 2 submitted a pre-training video but was unable to record and submit a post-training video due to the child's illness and subsequent backto-back hospitalizations after the training course ended. Consequently, this participant was not included in the pre- and post-training video analyses.

*Participant 3.* Participant 3 was a developmental services provider with 6-10 years of experience providing EI on a part-time basis. She submitted a pre-training video but was unable to record and submit a post-training video. After the training course ended, multiple members of the family with whom she had recorded the pre-training video became ill. When she was able to

attempt to record the post-training video, the child became upset with the camera in the room and she was unable to record the video after multiple attempts. Consequently, this participant was not included in the pre- and post-training video analyses.

*Participant 4.* Participant 4 was a developmental services provider with a background in early childhood special education who reported having 3-5 years of experience providing EI. She submitted a pre-training video but was unable to record and submit a post-training video. Following the training course, the child in her pre-training video became ill and was hospitalized. She attempted to contact the caregiver after the child came home but the caregiver reported that the physician had recommended that the child rest for several weeks, so it was not possible to record the final video. Consequently, this participant was not included in the pre- and post-training video analyses.

*Participant 5.* Participant 5 was a speech-language pathologist with 3-5 years of experience providing EI services. She successfully recorded intervention visits with the same caregiver and child before and after training. On her pre-training video, Participant 5 demonstrated five occurrences of the target strategies, including three occurrences of reflective conversation and two occurrences of caregiver practice with feedback. There were no occurrences of collaborative problem-solving or joint planning observed during coding. However, Participant 5's pre-training video was edited down to 32 minutes by deleting the last 17 minutes from the video. It is possible that collaborative problem-solving and joint planning were used during this deleted portion of the video. On Participant 5's post-training video, her use of the EI adult learning strategies increased to a total frequency of 16 occurrences. Four occurrences of reflective conversation, seven occurrences of caregiver practice with feedback, four occurrences of collaborative problem-solving, and one occurrence of joint planning were

coded. Despite the fact that 29 minutes were edited from the end of her post-training video, Participant 5 still showed a large increase in the frequency of her use of all of the EI adult learning strategies, with an overall increase of 11 more occurrences following the training (see Figure 2). This represented a 220% increase in her total usage of the EI adult learning strategies from pre- to post-training. Her greatest increases were in her use of caregiver practice with feedback and collaborative problem-solving.



*Figure 2*. Changes in the frequency of occurrence of the use of four EI adult learning strategies from pre- and post-training videos for Participant 5.

*Participant 6.* Participant 6 was a developmental services provider with a background in early childhood special education and more than 11+ years of EI experience. She was able to record both pre- and post-training videos, but both files were corrupt and were unable to be transferred to the researcher/trainer after multiple attempts. Participant 6 sent her files via Filelocker several times but the files were unplayable. The researcher/trainer and Participant 6 met in-person to attempt to transfer the video files directly from the participant's iPhone to the researcher/trainer's encrypted flash drive, but all attempts were unsuccessful. Participant 6 also consulted with her agency's information technology specialist, who was unable to recover the files. Consequently, this participant was not included in the pre- and post-training video analyses.

*Participant* 7. Participant 7 was a physical therapist with 3-5 years of EI experience who was working part-time in EI. Her pre- and post-training videos were recorded with two different families after the first family unexpectedly left the EI program during the training course. In her pre-training video, Participant 7 demonstrated seven occurrences of using the EI adult learning strategies, including five occurrences of reflective conversation, one occurrence of caregiver practice with feedback, no occurrences of collaborative problem-solving, and one occurrence of joint planning. During her post-training video, she exhibited eight occurrence of caregiver practice with feedback, one occurrence of collaborative problem-solving, and one occurrence of joint planning. Her use of the EI adult learning strategies was fairly consistent across both videos, increasing by just one occurrence despite the fact that she worked with two different families. She demonstrated a 14% increase in her total usage of the EI adult learning strategies from pre- to post-training, specifically in the use of collaborative problem-solving (see Figure 3).



*Figure 3*. Changes in the frequency of occurrence of the use of four EI adult learning strategies from pre- and post-training videos for Participant 7.

*Participant 8.* Participant 8 was a speech-language pathologist with 11+ years of experience working in EI. Both videos were recorded with the same caregiver and child. On the pre-training video, Participant 8 demonstrated eight occurrences of using the EI adult learning strategies, including four occurrences of reflective conversation, three occurrences of caregiver practice with feedback, no occurrences of collaborative problem-solving, and one occurrence of joint planning. On her post-training video, a decrease in the use of the strategies was noted by two occurrences. After training, she demonstrated a total of six occurrences, including three occurrences of reflective conversation, one occurrence of caregiver practice with feedback, no occurrences of caregiver practice of caregiver practice problem-solving, and one occurrences, including three occurrences of reflective conversation, one occurrence of caregiver practice with feedback, no occurrences of collaborative problem-solving, and one occurrences of planning (see Figure occurrences of collaborative problem-solving, and one occurrence of planning (see Figure problem-solving).

4). Her most notable difference across videos was the decrease in the use of caregiver practice with feedback, followed by a decrease in reflective conversation and an increase in the use of collaborative problem-solving. It is important to note that upon review of her post-training video, much of the conversation between the parent and Participant 8 focused on the child's progress and the caregiver's lack of concern for the child's current development. Participant 8 invited the parent to share her concerns or challenges with the child's development, but the parent consistently expressed no concerns and her relief that her child was now talking. It is possible that this may have affected what could be accomplished during the session and may have contributed to the 25% decrease in Participant 8's total use of the EI adult learning strategies from pre- to post-training.



*Figure 4*. Changes in the frequency of occurrence of the use of four EI adult learning strategies from pre- and post-training videos for Participant 8.

*Participant 9.* Participant 9 was a speech-language pathologist with 11+ years of experience as an EI service provider. She recorded both pre- and post-training videos with the same caregiver and child. On her pre-training video, Participant 9 demonstrated nine occurrences of using the EI adult learning strategies, including five occurrences of reflective conversation, one occurrence of caregiver practice with feedback, two occurrences of collaborative problem-solving, and one occurrence of joint planning. On the post-training video, she exhibited an increase in the use of the EI adult learning strategies to 12 occurrences, including four occurrences of collaborative problem-solving, and one occurrence of preflective conversation, five occurrences of caregiver practice with feedback, two occurrences, including four occurrences of collaborative problem-solving, and one occurrence of joint planning. Her use of the EI adult learning strategies increased from pre- to post-training by a total of three occurrences, representing a 33% increase in her total use of the strategies. Her most notable increase was in the use of caregiver practice with feedback (see Figure 5).



*Figure 5*. Changes in the frequency of occurrence of the use of four EI adult learning strategies from pre- and post-training videos for Participant 9.

*Summary*. Five participants successfully submitted pre-post video pairs which were analyzed for the frequency of occurrence of the EI adult learning strategies. Four of the five participants demonstrated increases in their use of at least one strategy from pre- to post-training, ranging from a 14-220% increase in the demonstration of the use of the strategies post-training. When occurrence scores from all participants were combined, an increase in the total frequency of use of the EI adult learning strategies from pre- to post-training was noted. The greatest gains within the group were found for the use of caregiver practice with feedback and collaborativeproblem-solving (see Figure 6). This finding should be interpreted with caution as Participant 8 did not increase her use of EI adult learning strategies on her post-training video and Participant 5 showed a large increase (of 11 occurrences) in her frequency of use of strategies from pre- to post-training.



*Figure 6.* Changes in the frequency of occurrence of the use of four EI adult learning strategies from pre- and post-training videos across all five participants.

All participants had prior training in the use of early childhood coaching, which emphasizes the use of reflective questioning (which is similar to reflective conversation) and joint planning, so the fact that increases in the uses of these strategies were minimal (both increased by one occurrence from pre- to post-training) is not unexpected. The high rate of increase in the uses of caregiver practice with feedback (by seven occurrences across two participants) and collaborative problem-solving (by six occurrences across three participants) appears to be associated with participation in this training course as these participants had not received previous state-sponsored training in the use of these strategies. These strategies were emphasized in the training course content, as they both focused on active interactions between the service provider and caregiver during the visit. Both strategies are also used to facilitate the caregiver's ability to implement intervention strategies between visits, which was also discussed in depth during the training course. Based on the analysis of the video submissions, there was an increase in the frequency of use of the four EI adult learning strategies that appeared to be associated with completion of the training course.

## Knowledge Acquisition: Pre-post Knowledge of Adult Learning Principles and Strategies

To answer Research Question 2, data from the 20-item pre-and post-training knowledge measures, developed by the researcher/trainer based on course content, were analyzed using paired sample *t*-tests to determine if any statistical differences could be detected between the participant group's scores before and after the training course. Fifteen paired sample *t*-tests were conducted on the knowledge measure items with different results from pre- to post-training to look for any patterns of significance across items. An additional paired sample *t*-test was also conducted to compare the pre- and post-training knowledge measure scores across participants. Because a total of 16 *t*-tests were performed, the experiment-wise criterion for statistical significance was determined by dividing the alpha level (.05) by the number of tests (16) (Sprinthall, 2007). The criterion was determined to be .003125.

Statistical analysis of total scores across participants. Based on a criterion of .003125, a statistically significant increase in knowledge from pre- to post-training was identified (t = 4.299, p = .003). Effect size was calculated to provide further information about the change in knowledge before and after training using Cohen's d (Cohen, 1992). To calculate Cohen's d for a

repeated measures (within-subjects) design, additional factors were accounted for by entering the correlation between means, in addition to the means and standard deviations, into the analysis. A very large effect was noted in the change in knowledge following the training (d = 1.487). A statistically significant increase in knowledge was also noted for knowledge measure item Q1, which required that participants identify the three components of effective adult learning experiences, which were planning, application, and deep understanding (t = 8.000, p < .001), with a very large effect (d = 3.780). As noted on Table 18, all participants answered this item incorrectly on the pre-training knowledge measure, and eight participants answered correctly on the post-training knowledge measure.

## Table 18

Number of Participants Who Answered Pre- and Post-training Knowledge Measure Items Correctly

Correct Item	Pre-training	Post-training	Sig.
Most effective adult learning experiences include: planning, application, and deep understanding (Q1)	0	8	.000
When service providers use coaching, caregivers are more likely to demonstrate: increased responsiveness and engagement, improved ability to use intervention strategies daily (Q2)	9	9	
When adult learners associate new learning with prior knowledge, they are better able to store new information in long term memory (Q3)	4	6	
Adult learners want feedback on their learning and performance (Q4)	4	6	
Which is least likely to help caregivers apply what they learn during intervention visits: observing the service provider interact with the child (Q5)	6	7	
Tracy coaches Marlene as she practices holding Ella's hips to keep her stable in supported standing. Ella keeps bending her knees and trying to sit down instead of stand. Which strategy should Tracy use to support Marlene: collaborative problem-solving (Q6)	6	6	
The two most important characteristics of an effective learning experience for adult learners are: active participation and reflection (Q7)	8	7	
Caregivers learn and remember most successfully when what they are learning is practiced: in context and in real time (Q8)	8	8	
Caregivers have reported that the most helpful activity that occurs during the	9	9	

Correct Item	Pre-training	Post-training	Sig.
intervention visit is: problem-solving with the service provider (Q9)			
Adults learn best through active participation and practice (Q10)	2	6	
The most important learning for the child happens: between visits during daily routines and activities with family members (Q11)	9	9	
Patricia, Blane's mother, is frustrated because she when she tries to put him in the car seat, he arches his back and cries. Which strategy should Emily, the service provider, use to begin coaching Patricia: reflective conversation (Q12)	2	5	
To help caregivers plan for intervention, the service provider can: model intervention strategies, observe the parent and child, share information (Q13)	9	9	
Coaching in early intervention is considered to be: a promising practice (Q14)	0	2	
Anna asks Ms. Davis about what she already knows about how to help Aidan maintain his head control while sitting in the high chair. Anna is using: reflective conversation (Q15)	7	9	
To help the caregiver problem-solve during the visit, the service provider can: ask about how the caregiver thinks she can adapt an intervention strategy when she uses it next time (Q16)	9	9	
To find out what intervention might be most immediately relevant and useful to the caregiver, the service provider can ask: "What are the biggest challenges during your day?" (Q17)	6	7	

Correct Item	Pre-training	Post-training	Sig.
Two strategies that help caregivers gain deep understanding of how to successfully use intervention with the child are: problem-solving and reflection (Q18)	2	5	
Collaborative problem-solving is a coaching strategy that is typically useful: before and after the caregiver practices using an intervention strategy (Q19)	5	7	
Tori, Jacob's child care provider, uses the sign for cookie and says "cookie" to prompt Jacob to request a cookie at snack time. Jacob puts his hands together and looks at Tori. Derrick, the service provider, says "It looks like Jacob is imitating your sign. I think he wants another cookie." Derrick is using: caregiver practice with feedback (Q20)	5	7	

Statistical analysis of items answered correctly across participants. An analysis was also conducted on items answered correctly on the pre- and post-training knowledge measures to identify any patterns across items and answers. Items were divided into two groups: items focusing on specific knowledge about adult learning principles, components, and strategies (e.g., Q1, Q3, Q4, Q6, Q7, Q8, Q10, Q12, Q15, Q18, Q19, Q20), and items focusing on general knowledge of early childhood coaching and recommended practices in EI (e.g., Q2, Q5, Q9, Q11, Q13, Q14, Q16, Q17). Paired samples *t*-tests were conducted on these two groups to compare knowledge gains between the pre- and post-training knowledge measures. Using an alpha level of p = .05, a statistically significant increase in knowledge was noted for answers in the first group (e.g., specific knowledge about adult learning principles, components, and strategies) from pre- to post-training (t = 3.600, p = .007), with a very large effect (d = 1.772). Knowledge gains for the second group of answers (e.g., general knowledge of coaching and recommended practices in EI) were not statistically significant.

Participants appeared to have previous general knowledge about coaching and recommended practices in EI as noted by the high number of correct answers on both the preand post-training knowledge measure on items that described more general information about coaching. For example, all participants answered Q2, Q9, Q11, Q13, and Q16 correctly on both measures. These items required participants to: 1) identify the positive outcomes of coaching on caregivers' abilities to engage their children and use intervention strategies; 2) identify problem-solving as the most helpful activity reported by caregivers to occur during visits; 3) identify the time between visits as the most important time for child learning; 4) determine strategies that help caregivers plan for intervention; and 5) identify a problem-solving strategy that service providers can use to help a caregiver think about how to adapt a strategy. Few participants answered Q14 correctly, which was also specific to coaching but which was less applied. This item required that participants have familiarity with the evidence-base behind coaching in order to identify it as a promising practice.

Among most of the items related to the specific adult learning principles, components, and strategies taught during the training course (i.e., Q1, Q3, Q4, Q10, Q12, Q15, Q18, Q19, Q20), more correct answers were noted on the post-training knowledge measure. These items challenged participants' knowledge of specific content from the training course, including characteristics of adult learning and how to apply adult learning principles and strategies. As previously mentioned, one item, Q1, was answered incorrectly by all participants on the pretraining knowledge measure and correctly by eight participants post-training. Four items (i.e., Q6, Q12, Q15, Q20) described brief scenarios that required participants to apply EI adult learning strategies to real-world activities that could occur during intervention visits. Increases in the number of correct answers were noted for three of the scenario-based items (i.e., Q12, Q15, Q20). No change in the number of correct answers was noted on Q6 (e.g., six items were answered correctly pre- and post-training). Two other items with content specifically related to adult learning were either answered correctly by an equal number of participants from pre- to post-training (i.e., Q8 was answered correctly by eight participants on both measures) or answered correctly by fewer participants post-training (i.e., Q7 was answered correctly by eight participants pre-training and seven participants post-training). It is likely that participants used their prior knowledge of coaching and recommended practices in EI to inform their answers to Q7 and Q8, which focused on characteristics of effective adult learning experiences and adult learning in context and in real time – both topics that have been covered in other training about the use of coaching in EI in Virginia.

**Summary.** There was a statistically significant increase (with a very large effect size) in participants' knowledge of the five adult learning principles and how to apply associated EI adult learning strategies during visits with families after completing this training course. Participants demonstrated their prior knowledge of more general recommended practices in EI, including early childhood coaching, in their consistent answers to questions that tested this type of knowledge. Analyses revealed that participants gained the most information about adult learning principles, components, and strategies, which was the main focus of course content. Based on these analyses, it appears that participants exhibited significant knowledge gains after completing this training course.

## **Participant Perceptions of Training Effectiveness**

Social validity of this research project was examined using three methods: 1) a social validity survey completed by participants after the training course, 2) a follow-up phone interview with each participant after the training course, and 3) a comparison of initial and final self-assessments completed by participants during the training course. Results from each will be discussed.

Social validity survey. All participants completed the social validity survey within 18 days post-training (n = 9, 100%); eight participants completed it within eight days after the training and one completed it on day 18. All participants reported that they were highly satisfied with the training course (n = 9, 100%). Four participants described their satisfaction, noting that they liked the organization of the training course, liked how adult learning strategies were used to teach the content, and liked how the training course made them reflect on and gain a deeper understanding of their own practices. When commenting about the organization of the course,

two participants noted that self-reflection and follow-up feedback are "often missing" in more traditional training with the following comments

I loved the whole curriculum. Material/lecture one week followed by a support session the following week. It was a great way to apply new knowledge immediately and get good feedback just as quickly. This often doesn't happen with trainings, as we often attend, learn a lot and might come back to apply what we learned but the follow up feedback is often missing. The course is very beneficial both in the content as well as how it's presented and most definitely should be offered again! – Participant 6

This course was well organized. It combined new theory with application/practice and discussion with feedback. This class required participant commitment to channel their attention and complete additional readings and assignments. Use of self-reflection tasks is often missing in the traditional training of service providers in this field. – Participant 8

Two participants also commented about the benefits of self-reflection during the course by noting its effect on them as learners:

I really liked learning about the adult learning principles and how they tie into coaching this made me think more and have a deeper understanding of WHY coaching is so important and appropriate for EI as it is set in the natural environment within the family's daily routines (e.g., it builds on what is immediately relevant to them; it allows them to practice in real contexts and in real time; it supports the importance of reflection, collaborative problem solving, and joint planning). – Participant 9 I found the information to be stimulating and it evoked thoughtfulness - I also recognized and felt the use of adult learning strategies being utilized to teach us! By experiencing this process, it allowed me to understand how other adults like me learn.

- Participant 1

Prior to completing the training course, 67% of participants (n = 6) had limited knowledge and 33% (n = 3) had moderate knowledge of adult learning strategies. After the training course, participants reported extensive knowledge (n = 6, 67%) or moderate knowledge (n = 3, 33%) of adult learning strategies. When asked about how they will use the information they learned during the training course, all participants provided comments (n = 9, 100%). All participants commented that they would use what they learned in their work with families or were already using it (n = 9, 100%). More specifically, participants noted that the information learned helped them "think a little deeper about the families I am working with (as well as any new families)" (Participant 6) and helped them "work more closely with parents/caregivers to come up with early intervention strategies that are more tailored to the [family's] life style and their needs at the moment" (Participant 4). Four participants also described how they plan to use what they learned in their interactions with others outside of intervention visits, such as with their own personal families, with colleagues, in staff training, and with learners in courses or conference presentations they facilitate. Two participants noted that they will continue to use what they learned in their own practice or for their own professional development.

The training course was facilitated over six sessions. When asked about the length of the training course, 56% of participants (n = 5) responded that it was "just right." Rather than choose a response from the answer options (e.g., too long, just right, too short), the rest of the

participants (n = 4, 44%) chose to explain their answers using the "Other (please explain)" option. All four participants who commented noted that they would have liked the course to have been longer. Three participants reported that they would have liked more sessions during the training course, and one participant (Participant 1) reported wanting "additional follow-up sessions after an interval of time (1-2 months) for a wrap-around after time to process and practice." One participant did note that it may have been hard to commit to the course initially had it been advertised as much longer, but when the course ended, she was disappointed and would have like for it to continue. Another participant specifically described her interest in a longer course with this comment:

I think the length was good, however I definitely think it could have gone for a few more sessions. The material is thought-provoking and engaging and it was so great to be able to collaborate with other providers regarding cases and apply our knowledge while practicing. Six weeks is great, but I think it could definitely be extended to 8 weeks or even 10-12 weeks. – Participant 6

Participants were asked the rate seven characteristics of the training course using a 5point Likert scale with ratings of: excellent, good, average, fair, and poor. All participants responded to all items and all responses were in the "excellent" and "good" ranges (n = 9, 100%). All participants rated the overall training as "excellent" (n = 9, 100%). All participants also rated the usefulness of content and instructor's knowledge of the content as "excellent" (n =9, 100%). Organization of the training course, usefulness of resource links, presentation style of material presented, and the value of group discussion were all rated as "excellent" by 89% (n =8) of participants and "good" by 11% of participants (n = 1).

Participants were also asked to rate their agreement with ten statements pertaining to the training course using a 5-point Likert scale with ratings of: strongly agree, agree, neutral, disagree, and strongly disagree. A "Not Applicable" option was also offered but not used by any participant. All participants responded to all items and all responses were in the "strongly agree" and "agree" ranges (n = 9, 100%). Participants either strongly agreed (n = 8, 89%) or agreed (n= 1, 11%) that the format of the training course worked well for them. All participants strongly agreed that they liked the interactive format for receiving information about adult learning in EI, and that the format of the course was more effective than a single workshop. All participants either strongly agreed (n = 8, 89%) or agreed (n = 1, 11%) that they liked the embedded support sessions as a way of receiving feedback and support. When asked about their agreement with statements related to the usefulness of information learned, all participants strongly agreed (n =9, 100%) that: 1) the information was practical and useful in their work; 2) they were able to use what they learned immediately in their work with families; and 3) they learned about strategies that they will continue to use in their work with families. When asked about their knowledge, skills, and confidence following the training course, all participants strongly agreed (n = 9, n)100%) that their knowledge and skills related to supporting caregiver learning during EI visits had increased. All participants either strongly agreed (n = 8, 89%) or agreed (n = 1, 11%) that they felt more confident in their knowledge of adult learning in EI, and all participants strongly agreed (n = 9, 100%) that the training course will have a positive impact on their professional work.

Participants were surveyed about their use of technology, including the webinar software, conference call line, and specific webinar tools used during training sessions. Regarding technical difficulties encountered during the training course, participants reported no difficulties

with calling in to the sessions (n = 9, 100%). Some participants noted difficulties with logging in to the training sessions (n = 2, 22%). Slightly more participants noted difficulties with participating in the training sessions using the webinar tools (n = 3, 33%). Only one participant (11%) noted difficulty with accessing the online resources including readings and video examples shared by the trainer. Four participants (44%) noted difficulties with uploading their videos of their EI visits. Comments about the difficulties noted by participants focused on the video uploads and general use of technology. Two participants commented that difficulties with uploading their videos may have been due to issues with their video equipment (using their iPhone or iPad) and with not having someone present during the EI visit being recorded to manage the camera. Another participant commented that she got disconnected from the course at times but was able to hear what was being taught via the conference call line. Another participant (Participant 3) noted that "issues were resolved quickly."

Webinar tools were used during course sessions to facilitate interaction with and among participants and help maintain attention. Regarding the use of webinar tools during the course sessions, all participants reported using the chat tool (n = 9, 100%). The text tool was used by most participants (n = 7, 78%) followed by the pointer tool, which was used by slightly fewer participants (n = 5, 56%). The chat tool was always available to participants to use at any time during course sessions to make comments or ask questions and was frequently used by most participants across the course. The text and pointer tools were only used during planned interactions during sessions, such as when participants were asked to brainstorm by typing their thoughts on-screen using the text tool or answer a multiple-choice question on-screen by placing a pointer icon on their choice. If participants had difficulty using the text or pointer tools, they were able to share their input using the chat as a back-up tool.

Participants were asked about their experience with completing a web-based training course prior to this activity. Most participants (n = 6, 67%) indicated that they had completed some form of web-based training. Eight participants commented about their previous experiences. Four participants primarily noted that they had participated in brief webinars before this course, either as live webinars or by viewing archived recordings. Five participants reported having completed at least one online course for graduate or post-graduate credit but the length and format of these courses was not consistently described. When asked to rate their experience completing this training course compared to other experiences with web-based training, seven participants (n = 7, 78%) rated their experience as excellent. One participant rated her experience as poor and one other participant (Participant 1) chose the "Not applicable as I have not completed any other web-based training" option. Five participants commented on their experiences, with all comments focused on the increased interaction and discussion opportunities during this course. Participants described how they "liked how this training allowed for more interaction and discussion" and how "this course had more group interaction and group voices added to the learning." One participant noted that she had received more feedback in this course and another noted that she liked "how calm and non-threatening the instructor made the class." Another participant commented on the overall organization of the course:

Again, the way this training was set up was very beneficial with lecture/material one week, then time to apply in real life, followed by a week of feedback/insight/deeper thinking with classmates. – Participant 6

The final question on the survey invited additional feedback from participants about the training course. Six participants commented on this item. Three participants shared positive

feedback about the training course, with Participant 5 describing it as "very informative, helpful, caring, and a joy to learn from." One participant (Participant 6) noted that the course was "a fantastic way to provide training and professional development. It should most definitely be repeated." Another participant commented on the course format, as compared to typical one-shot workshops:

I loved the course format...learning, practicing, and then returning for support sessions versus learning in a one-day course, trying and being left to figure it out on your own. - Participant 7

Additional comments included feedback that could be used to improve the course. Participant 8 noted that the video upload was "extremely time consuming" and "not practical with active work schedule, data consumption in rural areas." This same participant suggested reformatting the self-assessment to make it easier to "indicate change in pre and post knowledge." Participant 3 suggested having a "visual," or pictures of class members, and Participant 9 requested more information so that she could "continue with some self-study and delve deeper."

To summarize, feedback from the social validity survey indicated that all participants felt positively about their learning experience and perceived the training course as beneficial to their professional practices. All participants reported being highly satisfied with the training course. They reported gains in their knowledge of adult learning strategies, which was confirmed by the results of the pre-post knowledge measures. Participants reported that they liked the organization of the course and found the embedded support sessions to be helpful as a means of receiving feedback and support. Participants felt that they benefitted from the opportunities for selfreflection and gained a deeper understanding of coaching and adult learning. All participants "strongly agreed" that they were able to immediately use what they learned in their work with families and that the training course would have a positive impact on their professional work. When asked to compare this training course to a single workshop, all participants "strongly agreed" that it was more effective.

**Follow-up interview.** A follow-up interview was conducted with each participant within eighteen days after the training course ended to gather more feedback about the course and provide additional ongoing support. Participants were asked eight open-ended questions to probe their perceptions about the training course. Specifically, participants were asked about their: 1) overall experience as a learner; 2) experiences participating in the interactive webinars and embedded support sessions; 3) experiences with trying to apply what they learned between sessions, and 4) experiences with the self-assessments. Participants were also asked to describe what they learned from recording themselves for the pre- and post-training video submissions and the specific ways they have used what they learned during the training course. Finally, participants were invited to share any other feedback about the course. Interviews were conducted by phone and were scheduled at the participant's convenience. Interviews were recorded and the researcher took notes during the call to capture participants' answers. Interviews lasted between 29-61 minutes, depending on the length of participants' answers. See Appendix C for the follow-up interview questions.

Analysis of participants' answers to the follow-up interview questions revealed six themes related to: 1) participation in training course sessions and activities; 2) benefits of hearing other service providers' perspectives and experiences; 3) effects of participation on professional thoughts and practices; 4) application of knowledge and skills learned; 5) course organization, format, and facilitation; and 6) suggestions for improving the training course. Each theme will be discussed.

*Participation in training course sessions and activities.* All participants indicated that they enjoyed the course and that participating in it was a positive learning experience for them. Four participants indicated that they would take the training course again and/or recommended offering the course again for others. When asked to describe their participation in the interactive webinar sessions, most participants noted that it was easy to participate and communicate using the chat tool. Participants 3 and 4 indicated some level of discomfort with using some of the webinar tools but that their comfort increased as they learned how to use them or learned that they could type in chat rather than use the other tools offered (i.e., drawing or pointer tools). Participant 1 described the interactive webinar "content" sessions as "really powerful," noting that she liked the graphics used in the Power Point slide deck to represent the "dynamic process" of how the adult learning components were interconnected. Similarly, Participant 9 noted that the content was relevant to EI and that the readings that were tied to the content in these sessions provided a "good way to anchor discussions and keep us on the same theme."

Participants were also asked about their participation in the embedded support sessions. All participants reported positive experiences with these sessions, most notably related to hearing other's experiences and perspectives. Five participants expressed some initial anxiety or nervousness about speaking during these sessions. Several of these participants noted that participating in the embedded support sessions became easier with time and that they found them interesting and helpful. Participant 10 summarized these feelings in this way: After I got used to them, it was nice to hear others' experiences and reflections. It helped me think about it in a different way. I have my own perceptions so this was helpful to hear others. Hearing others having similar thoughts was nice.

When asked about their experiences using the initial and final self-assessments, which were completed before the first and third embedded support sessions, participants had positive feedback and suggestions for improvement. Participant 2 "loved the self-assessments" and how they helped her be "very aware of when I do the practices." Five other participants described the self-assessments as good tools that helped them see progress in their own development and help them identify areas in which improvement was needed. Participant 1 described the self-assessments as providing "opportunities to really think about what I wanted to write. This elicited a process for me that was really helpful and insightful..." She also noted "more cohesiveness" in her thoughts about how to support caregiver learning after completing the self-assessment process.

Regarding their experiences with recording their pre- and post-training videos, participants provided mixed feedback. Seven participants described reflections on their own practices that occurred to them as a result of recording and/or watching the videos. Participant 3 noted that the "video helped me see patterns I can't see in real life because I just do it day to day." Three participants found that they "talked too much" during their visits, and three others noted missed opportunities to address the child's developmental outcomes or help the parent promote development during the family routine. Four participants described positive effects of recording themselves, including realizing that they had made progress, had increased confidence, and benefited from a "fresh look." Four participants indicated that they either did not watch all or any their videos or did not learn from them. Two participants indicated that the video submission component of the training course was stressful. One of these participants (Participant 9) also noted that while the video component made her initially avoid registering for the course, she realized that once she completed the videos, she "was harder on herself in the moment but when I watched it, it wasn't so bad." She also shared that it was "nice to be able to do and watch the videos."

*Benefits of hearing other service providers' perspectives and experiences.* Eight participants described the benefits of hearing from other service providers about their experiences, insights, and ideas. These participants all said that they liked hearing what other participants had to say, including their reflections and suggestions for intervention. Four participants liked hearing how others worked with families, including strategies they had tried with families. Three participants specifically mentioned gathering ideas from fellow participants and taking notes of things to remember, including "nice tangible suggestions." Four participants mentioned that hearing what others said was valuable because it helped them "go deeper;" "think in a different way," and helped them feel less isolated since they work so independently out in the community. Participant 8 shared that the embedded support sessions "made me feel like I was not the only one experiencing [difficulties], that I was not alone, not so isolated."

*Effects of participation on professional thoughts and practices.* In addition to benefiting from interacting with others during the course, participants also reported benefits from participating in the training course as a whole. Two respondents reported increased confidence in their roles as EI service providers. Participant 5 reported that she felt "more confident having more structure to visits now...I feel more confident and organized on visits." For her, "increased confidence was most beneficial." Responses from five participants described how the experience

of learning the content and completing the self-assessments made them think about what they were doing during their visits and why they were doing it. Participant 9 described herself as "...definitely more thoughtful of how I ask families what they wanted, their routines, to get them to practice. Now I'm more thoughtful of why I'm doing the things I'm doing." Participants described how the course content made them reflect on their practices and their approach to EI visits. During her interview, Participant 3 repeatedly referred to herself as "more intentional now," indicating that she felt more focused and that it was now more clear to her what she was supposed to do when working with families, which made it easier to explain EI to families as well. She also said, "Now I could be more intentional so they [families] practice while I'm there so they'll do it later," reflecting an increased understanding in the importance of preparing families to use intervention strategies between EI visits.

Improved understanding of coaching was also reported by five participants. These participants described how this training course allowed them to gain a deeper understanding of coaching in the EI context which helped them understand why coaching is a recommended technique to support caregiver learning. Three participants noted how the focus on adult learning during each session became ingrained in their minds and that this focus helped them realize that, as one participant described, "adult learning is a platform for effective coaching." Another participant reported that she now finds it much easier to explain coaching to new parents. Similarly, two other participants reported an increase in personal comfort with coaching, indicating that they felt better about coaching after completing the training course, despite having completed other coaching trainings in the past.

*Application of knowledge and skills learned.* When asked about their application of the knowledge and skills learned during the training course, all participants reported actively using

what they learned with families. Participant 2 reported that completing the self-assessments and knowing that participants' application experiences would be discussed during the embedded support sessions motivated her and made it easier for her to try to use what she had learned. All participants noted differences in their own perspectives and practices as well as differences with caregivers' level of engagement. Two participants noted that, before the course, they typically had their own agendas for each visit. Following the course, both reported being more aware of the importance of exploring the caregiver's perspective and planning intervention around what is important and relevant to the caregiver. Participant 3 noted, "I liked the "I'm the expert" role but this is not coaching. Now, I respect how much they know and go from there." She also shared that she did not see the connection between EI and adult learning before, saying:

In the past, I talked to parents about child learning and didn't think about it before – how to help the parent work [intervention] into the routine and relate it to the parent. I'd made an assumption about how the parent learned. I'm more aware now so I talk about their perspective rather than just the child's. I love playing with the child, but this really made me step back. I need to not get in the way of their interaction. Before class, I was not including adults enough in the EI process; I assumed they got it. Now, I'm talking to the parent about practicing and problem-solving.

Participant 4 shared similar sentiments, noting:

I am more conscious of asking them "what would you like to work on today?" and working on their goals...I used to walk in with my plan and now I catch myself. It's not my agenda; it's what they want to do. That's a really good thing. Likewise, Participant 9 described how she is now helping parents "feel validated." She reported that "before, it didn't occur to me that the parent might not realize her own impact." She said she now she wants to "make sure the parent knows what they've done and that it is helpful, that they played a part." This participant reported that using what she learned is helping her improve her ability to help parents "recognize their own actions."

Several participants reported improvements in their use of specific EI adult learning strategies, specifically reflective conversation, collaborative problem-solving and caregiver practice with feedback. Participant 1 reported that she was spending more time interacting with the caregiver to support practice and problem-solving about how else to use an intervention strategy throughout the day and with other caregivers. Participant 2 also reported increased comfort with asking parents to practice using intervention strategies in the moment, noting when that she asks, she finds that families are agreeable to practicing and it seems to help the family. Participants 5, 8, and 9 described using more open-ended questions, explaining intervention more thoroughly, and exploring how to help families use intervention strategies. Participant 9 summarized her feedback in this way:

Yes, I think I have used the skills probably in every encounter, in every visit. Now I see the power of that, that I can't let the family figure it out on their own. I am giving input but allowing them to grow with it.

*Course organization, format, and facilitation.* All participants also provided feedback about the course organization, format, and facilitation. Four participants described the course as well-organized and three participants liked the small group size. Three participants commented on specific aspects of the course format, sharing that they liked the length of sessions as 1.5

hours, liked having a break during sessions, appreciated the course being offered online, and liked the pace of the course. Participant 1 noted that the way each content session was organized and facilitated was similar to how EI is provided. When describing the course, she noted "each content session looked at the same information in different ways – same as how we work with families."

Five participants specifically described how they enjoyed the format and facilitation of the training course, which allowed them to learn content then apply it between training sessions. Participant 4 noted that she "really liked the format – being able to talk to others in class, having both chat and hearing voices about experiences. I liked being able to learn something then go out and try it with families. Good to get feedback, a really good way to learn." Similarly, Participant 8 compared this experience to other coaching trainings. She noted that "the main reason I signed up – I had taken coaching courses before but was left on my own. This worked well to learn and try it out as you learned. I liked that." Participant 1 also liked how this process was facilitated, describing it in this way:

...you shared information and then gave us the opportunity to apply it between sessions then reflection and share or present ways we were successful and then receive feedback. It felt comfortable. We were all engaged in the process – a really nice, healthy, inviting community to participate in.

Two participants described the specific focus of the course. Participant 9 noted that the course focus and facilitation were specific and stayed on topic, which helped her focus on what to work on for her own practices. She and another participant (Participant 5) appreciated that participants

were expected to develop their own plan for improvement after each session, which also kept them focused.

Suggestions for improving the training course. Participants offered an array of suggestions for improving the course during the final interviews. Overall suggestions addressed the length of the course, adding additional sessions, and providing additional information or resources to participants. Two participants suggested adding additional sessions to make the course longer. Participant 9 indicated that she was initially concerned about the 6-week time commitment, but when the training course was finished, she "felt like more sessions would be okay...I thought we could've done one more session...to tease out the adult learning strategies and how they thread through coaching." This participant, and Participant 1, suggested adding more content to the training course, with one participant recommending adding a second interactive webinar session before the first embedded support session. Other suggestions included providing participants with: 1) more information about the time commitment to complete work outside of attending the sessions; 2) providing answers to the post-training knowledge measure after all participants have completed it; 3) providing a list of resources and references so participants can learn more; 4) providing photos of participants for a visual reference; and 5) offering the course again but avoiding Wednesday evening because of church activities.

Suggestions were also provided that related to specific aspects of the training course. Regarding the training sessions, Participant 9 recommended providing participants with copies of the Power Point slide decks and chat logs after each session as a resource for them to review what they learned. Participant 6 suggested more closely timing participants' responses during the embedded support sessions. Two participants noted that the self-assessments were somewhat challenging to complete because of the Likert scale choices, both suggesting rewording the choices to make them more realistic. They indicated that it was very difficult to choose "Always" because each intervention visit and each family are different. Three suggestions were offered regarding the video submissions, including: 1) making video submission easier, perhaps by allowing participants to submit by sending their videos on flash drives via mail; 2) providing a tool that participants could use to critique their own videos; and 3) providing feedback to participants about their performance on the videos. This final request for feedback was suggested by multiple participants.

During the final interviews, participants provided feedback about their perceptions of the training course, their own abilities to use what they learned, and how the course could be improved. Similar to the findings from the social validity survey, participants indicated that they enjoyed the training course and found it beneficial. Participants found participating in the interactive webinar sessions easy and informative. Likewise, they reported positive experiences with participating in the embedded support sessions. Some participants experienced some initial anxiety with speaking during the embedded support sessions, but this became easier with time. Completing the self-assessments was associated with increased awareness of professional practices (e.g., what they do and why they do it) for some participants. Increases in knowledge and skills related to supporting caregiver learning and improved understanding of coaching were reported by many participants. Regarding course organization and facilitation, participants reported that they liked the format and felt that it was a good way to learn. They described the training course as well-organized, engaging, and relevant to their work.

**Initial and final self-assessments.** All participants provided information about their perceptions of their practices, their strengths, challenges, and plans for improvement on the

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initial and final self-assessments. These self-assessments were provided to participants by email as Word documents prior to the first and third embedded support sessions. Participants were instructed to complete each self-assessment and email a copy back to the researcher/trainer by noon on the day of the embedded support session. All participants returned their completed selfassessments and the researcher/trainer reviewed them before the session.

The initial and final self-assessments included 12 close-ended statements describing EI practices that support caregiver learning. Participants were instructed to rate their own practices against these statements using a 4-point Likert scale which included the following answers: Never, Sometimes, Most of the time, and Always. The scale also included an option for "I don't know." When comparing the results of the initial and final self-assessments on these 12 items, there appears to be a shift from most answers being in the "sometimes" and "most of the time" columns on the initial self-assessment to the "most of the time" and "always" columns on the final self-assessment. Figures 7 and 8 compare changes in answers across both self-assessments.


*Figure 7.* Percentage responses to items on the initial self-assessment from participants (n = 9, 100%).



*Figure 8.* Percentage responses to items on the final self-assessment from participants (n = 9, 100%).

Participants' ratings of their practices. A comparison of answers to the statements from the initial and final self-assessments suggests that participants perceived improvements in their implementation of the four EI adult learning strategies taught during the training course. Regarding the implementation of reflective conversation, 67% of participants (n = 6) reported that they "always" "worked closely with caregivers to plan for intervention" on the final selfassessment, compared to 22% of participants (n = 2) who reported "always" on the initial selfassessment. A similar improvement was noted in that 78% of participants (n = 7) indicated that they always "focus intervention on what was immediately relevant and useful to the family" on the final self-assessment, compared to 22% of participants (n = 2) who reported "always" when assessed initially. When asked about their use of "questions to explore what the caregiver already knows or has already tried before developing intervention strategies," 44% participants (n = 4) on the final self-assessment indicated "always," 44% (n = 4) indicated "most of the time," and 11% (n = 1) indicated "sometimes." This is an increase from the initial self-assessment, when only 11% (n = 1) of participants reported "always," 33% (n = 3) reported "most of the time," 44% (n = 4) reported "sometimes, and 11% (n = 1) reported "never."

Participants' perceptions of their use of the caregiver practice with feedback strategy also increased during the training course. On the initial self-assessment, 67% of participants (n = 6) reported "most of the time" and 33% (n = 3) reported "sometimes" in response to the statement, "The caregiver practices using intervention strategies with his/her child during the visits." On the final self-assessment, the same number of participants (n = 6, 67%) reported "most of the time,"

but 33% (n = 3) reported "always." This represents a shift from some caregivers being offered opportunities to practice during visits prior to the first embedded support session, to most or all caregivers being afforded these opportunities by the third embedded support session. Similarly, an improvement was noted in the provision of "specific feedback to the caregiver about his/her use of intervention strategies." Initially, 67% of participants (n = 6) reported "sometimes" and 33% (n = 3) reported "most of the time." On the final self-assessment, 56% of participants (n =5) indicated that the "always" provided specific feedback, while 33% (n = 3) indicated "most of the time" and 11% (n = 3) indicated "sometimes." When asked to rate whether they "provide more than one opportunity for the caregiver to apply what he/she is learning during the visit," 44% of participants (n = 4) reported "most of the time" and 56% (n = 5) reported "sometimes" on the initial self-assessment. On the final self-assessment, all participants were in the "most of the time" (n = 7, 78%) and "always" (n = 2, 22%) ranges.

Statements related to perceptions about the implementation of collaborative problemsolving also suggested improvements. On the initial self-assessment, 22% of participants (n = 2) reported "always," 67% (n = 6) reported "most of the time," and 11% (n = 1) reported "sometimes" when asked whether they "...discuss any successes and challenges with using intervention strategies with the child" with the caregiver. The final self-assessment revealed that more participants were having these discussions, as indicated by the 78% (n = 7) who reported "always" and 22% (n = 2) who reported "most of the time." Problem-solving, which would follow this discussion, was reported by only 11% of participants (n = 1) as "always" and 44% of participants (n = 4) as either "most of the time" or "sometimes" on the initial self-assessment. Results on the final self-assessment suggested that helping "the caregiver problem-solve how to use intervention strategies during the family's daily activities" was a much more frequent occurrence on visits, as indicated by the 56% of participants (n = 5) who reported "always," 33% (n = 3) who reported "most of the time," and 11% (n = 1) who reported "sometimes."

There was only one item addressing joint planning, but this item showed improvements similar to those noted with the other strategies. Initially, 44% of participants (n = 6) reported that they either "always" or "most of the time" developed a joint plan with the caregiver during each visit to plan for what he/she will do with the child between visits. On the final self-assessment, most participants reported "always" (n = 7, 78%), with the others reporting that joint planning occurred "most of the time" (n = 2, 22%).

Three other items on the self-assessments focused on more general recommended practices that are reflected in the implementation of all four of the EI adult learning strategies. Improvements were noted in how participants perceived the focus of their visits as being on "helping the caregiver learn how to support his/her child," with 33% (n = 3) reporting "always," 56% (n = 5) reporting "most of the time," and 11% (n = 1) reporting "sometimes" initially, compared to 67% (n = 6) reporting "always" and 33% (n = 3) reporting "most of the time" on the final self-assessment. A notable shift was reported in participants' use of observation of parentchild interactions, which is important for both caregiver practice with feedback and collaborative problem-solving. On the initial self-assessment, only 11% of participants (n = 1) perceived that they "always" took the time to "observe the parent and child interacting during natural activities." On the final self-assessment, 78% of participants (n = 7) "always" reported that they took the time for this observation. Similarly, when asked about helping "the caregiver to understand how and why to use intervention strategies/suggestions with the child," 33% of participants (n = 3) initially indicated that they "always" did this, compared to 78% (n = 7) who indicated "always" on the final assessment. This statement on the self-assessments was designed

to help participants reflect on their facilitation of the caregiver's deep understanding of the use of intervention strategies, which was discussed as a by-product of using the EI adult learning strategies and a goal of supporting caregiver learning. On all items, most of the participants appear to have improved in their application of the EI adult learning strategies, which may be related to this 44% shift in the percentage of participants who "always" facilitate deep understanding with caregivers after learning more during the training course.

*Participants' perceptions of their strengths, challenges, and plans for improvements*. In addition to rating their own practices, participants provided descriptive information about their perceptions of their strengths, challenges, and plans for improvement. Both self-assessments included space for participants to write or type their reflections about their practices initially and again toward the end of the training course. Because their reflections were quite individualized, these data were analyzed by participant and across the group. This allowed a comparison between participants' perceptions of their practices with their demonstration of those practices on the pre- and post-training video submissions. An analysis of each participant's perceptions of her own strengths challenges, and plans for improvement on the initial and final self-assessments follows.

*Participant 1.* On her initial self-assessment, Participant 1 reported that her strengths included being an active listener, valuing parent knowledge and collaboration with the parent, and the belief that all families can grow and learn. On the final self-assessment, she described her strengths in more specific terms, writing that she had a "commitment to building relationships with families that is paramount to coaching and adult learning opportunities." The challenges she described on both self-assessments were similar to each other, focusing on increasing opportunities for caregivers to practice using intervention strategies with their children in real

time during the visit and across daily routines. On the final self-assessment, though, her focus was more specific to include the use of collaborative problem-solving in addition to practice opportunities for the caregiver. Initially, Participant 1 wanted to "model and provide more opportunities for practice and provide feedback" to the caregiver. She also indicated that she wanted to join families in their routines rather than just have conversations about using intervention strategies during routines. On the final self-assessment, this participant again focused on spending "more time in collaborative problem-solving that will result in more intervention opportunities throughout the day and therefore more learning opportunities for the family and child." From her experience in the training course, she appeared to have identified a specific EI adult learning strategy, collaborative problem-solving, which would help her achieve her goal of providing more collaborative, routines-based intervention support.

*Participant 2.* On both self-assessments, Participant 2 indicated that she regularly used reflection and problem-solving during her visits with families as her strengths. On the final self-assessment, she also added that she felt she was "getting better about practicing in the moment," which she mentioned as a challenge on the initial self-assessment when she noted that she had a "hard time always asking parents to try things that are difficult immediately." Initially, she felt more comfortable discussing these situations with parents rather than working on them in real time. This participant's plans for improvement on both self-assessments focused on a more general desire to improve her practices and keep using what she learned. It is important to note that this participant was already well-trained in the early childhood coaching approach which includes some characteristics that overlap with the EI adult learning strategies taught in this course. She also regularly mentored others in her program on this approach. On the final self-

assessment, she indicated that she wanted to help others learn what she had learned in the training course.

*Participant 3.* This participant listed strengths on both self-assessments including knowledge of child development and working well with children and families. On the final self-assessment, she added "improved knowledge of adult learning principles." Initially, her challenges focused on "involving the caregiver that is difficult for me to engage" and "helping caregivers see small improvements." Toward the end of the training course, her challenges were more specific with a focus on trying to explore daily routines with families on her visits rather than "just staying on the floor and playing." Participant 3 initially wanted to improve in her use of joint planning by leaving a written copy with the family rather than only recording it in her contact notes. Toward the end of the course, her plan for improvement was more reflective about how she could better support the caregiver's implementation of intervention between visits. She wanted to incorporate texting and the use of videos to support joint planning. She also shared the following reflection on improving her own practices:

...making sure I approach every session with the idea of incorporating the child doing a daily activity with the caregiver into the session rather than working all in one area of the home and having them incorporate me into their lives. I am trying to work with families to change up the time of the visit so that meals, snacks, walks, shopping, etc. are naturally included in the session...

This participant's information on the final self-assessment, including her ratings of her practices, indicated a shift in thinking from viewing herself as the teacher of the child during EI visits to an improved appreciation of and commitment to engaging the caregiver during visits.

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Participant 4. Participant 4 listed the same strengths on both self-assessments, including being a "people person" and a good listener, and having a positive attitude. Likewise, she also listed the same challenges, which focused on finding it difficult to "leave my desire to teach the child and teach the caregiver ways to work with the child" and to "not have my own agenda going into a session." However, on the final self-assessment she added additional challenges, including struggling with asking open-ended questions and allowing the caregiver the time to come up with strategies on his or her own rather than providing the answer immediately. She added that she felt she was improving in this area on the final self-assessment. This participant's plan for improvement also overlapped from the initial to final self-assessments, including items related to improving her overall coaching skills. On the final self-assessment, she added more specific tasks, such as planning to ask more open-ended questions to support caregivers in arriving at their own answers, allowing for more practice time for caregivers during visits, and leaving notecards with families that list the joint plan. Toward the end of the course, Participant 4 seemed to have several more specific strategies available to her to help her improve her ability to coach families.

*Participant 5.* Initially, Participant 5 listed strengths including helping parents learn how to support their children and working closely with the parent to develop an intervention plan. On the final self-assessment, she reflected that she was "now able to be sure the caregivers are working mainly with their child." This was an improvement for her because initially, she indicated that she struggled to give the caregiver opportunities to try using intervention strategies with the child during the visit and provide feedback on those attempts. She also indicated other challenges including helping the parent understand why certain strategies are used and asking "the right questions." Later in the training course, she indicated that these continued to be

challenges, particularly with one family with whom she worked. This participant's plan for improvement was more general on the initial self-assessment and included wanting to provide more practice opportunities for the parent and ask more open-ended questions. On the final selfassessment, Participant 5 listed more specific plans for improving her practices. She wanted to continue to work on asking open-ended questions and would use reminders to help her remember in the child's file. She also planned to ask to see the family she mentioned previously during a daily routine, rather than a more generic play activity, during her visit. This participant appeared to be working to implement what she had learned with a specific family and while she did not express success, she did appear to have a more specific plan for how she could improve her work with them.

*Participant 6.* Similar to other participants, Participant 6 listed personal traits as strengths initially, such as being a good listener, being comfortable in most situations, and being empathetic with and supportive of families. Toward the end of the training course, this participant was more reflective about her strengths with the following statement:

I think the thing that stuck with me the most that I was not doing before this course was remembering to explore what the family/caregiver already knew. It struck a chord with me at how important that can be when really beginning to focus on figuring out how a parent learns and simply where to start with intervention, helping them participate in problem-solving and discussing strategies they might practice.

This was an important for her because initially, on her plan of improvement, she mentioned struggling with "sitting back and helping the family figure out what they already know that can be useful in coming up with workable strategies." It appeared that this participant was reflecting

on a deeper understanding of why using reflective conversation was important during EI visits. On the final plan for improvement, she also indicated that pausing and helping the parent reflect was still challenging but that she thought she was improving. Participant 6 also mentioned wanting to improve in: 1) remembering the pause to support caregiver reflection and problemsolving rather than providing the solutions so quickly, and 2) providing feedback following practice opportunities. On both skills, she reported that she had improved since the initial selfassessment.

*Participant* 7. Initially, this participant reported her strength as allowing for intervention to be parent-driven. On the final self-assessment, her feedback reflected how she was more easily using caregiver practice, feedback, and problem-solving during intervention to ensure that it is "immediately important to the family." Participant 7 expressed the desire to collaborate with families more during their daily routines, as opposed to always playing on the floor, when describing her challenges on the initial self-assessment. When she completed the final self-assessment, her challenge had changed to remembering to explore the caregiver's prior knowledge before developing intervention strategies. Her plans for improvement on both self-assessments focused on using more reflective conversation and open-ended questions to explore the caregiver's previous experience and their challenges. Initially, this participant noted that becoming more comfortable and interactive with the caregiver by asking open-ended questions to help them reflect was challenging because it was "not in line with her personality." Participant 7 appeared to be continuing to work on these skills throughout the training course.

*Participant 8.* Participant 8 described her initial strengths to include taking the time to observe caregiver-child interactions, follow their lead, and discuss progress, successes, and challenges with the caregiver. On the final self-assessment, she was much more specific to the

course content, indicating that she was "strongest in the area of planning" and that she had "made gains in the area of application." She also said that she was doing better with helping the caregiver practice and understand why and how to use intervention strategies. Her initial challenges focused on getting caregivers involved during visits. Later in the course, she recognized a need to facilitate caregivers' deeper understanding to improve their involvement and their abilities to implement the joint plan. She seemed to feel that she had improved with increasing caregiver engagement, particularly with involving them more in the planning and application aspects of the visit, and had moved to focusing on how to better support them between visits. Participant 8's initial plan for improvement described the need to help caregivers share their prior knowledge and participate more in planning for intervention. She also wanted to improve the feedback she provided to caregivers by making it more specific. On the final selfassessment, she indicated that she continued to want to improve her use of reflective conversation especially from the first visit with the caregiver. She shifted from only wanting to provide more specific feedback to also wanting to remember to invite the parent to share feedback as well. Her new focus on deeper understanding was reflected here as well, with her reflection that she wanted to avoid overwhelming the family by developing a simpler joint plan in collaboration with them. This participant seemed to have developed her own deeper understanding of how to support caregivers, as seen in her shift from focusing on her own skills to more of a collaborative focus that integrated how to support the caregiver's abilities and understanding as well. It is also important to note that this participant emailed the researcher after completing the final self-assessment to share that she noted a decrease in her ratings on the self-assessment. She felt that the initial self-assessment was inflated because she had "learned

more and [could] see that although I have made improvements that I still need to become more consistent and comfortable in several areas."

*Participant 9.* Similar to Participant 8, Participant 9 reflected very specifically on her own improvements from the initial and final self-assessment. Initially, she described her strengths in relation to joint planning, noting that she always asks the family to take the lead in developing the plan and then always follows up on it during the next visit. On the final selfassessment, she reflected on how she had developed additional strengths in other areas:

I am now much more thoughtful of trying to bring conversations back to the family's daily routines as a foundation for repetitive practice. I'm also trying to help them think, problem-solve, and brainstorm first – before I jump in with ideas.

This participant's initial challenge was with joining family routines to facilitate more practice opportunities for caregivers. After several training course sessions, she reported that she continued to be concerned that caregivers may not be getting enough "hands-on practice," but added that she had recently observed a parent practice a strategy repeatedly while dressing her child and reflected that she (the participant) would not have suggested the parent do that because the child was getting annoyed. However, this practice opportunity was very positive for the parent. Participant 9 ended her reflection with this statement: "I guess I have to get past that feeling of it possibly being uncomfortable for me…" She recognized that her challenge included her own feelings rather than only external factors. For her initial plan of improvement, this participant again focused on joint planning and indicated that she wanted to ask more specific questions about when and how the caregiver will use a strategy to facilitate more discussion about practice in daily routines. On the final self-assessment, this participant seemed to have

moved from discussing practice opportunities to understanding the importance of facilitating them during the visit to prepare for joint planning. She reported that she wanted to involve the caregiver more in deciding if more practice is needed and how that practice should occur during the visit. She felt that by increasing the parent's involvement in planning for and practicing intervention strategies, that they might initiate practicing in new routines and activities, as she had seen on recent visits. From the initial to the final self-assessment, Participant 9 still wanted to help caregivers practice intervention during daily routines other than play, but seemed now to have a more specific approach for how to accomplish this.

Summary of participants' perceptions on the initial and final self-assessments for the training course. Initially, most participants shared more surface-level information about their own practices. They listed general characteristics of EI service providers (e.g., being a good listener, following the family's lead, understanding child development) or reported that they used strategies such as reflection, observation, or joint planning, which are associated with early childhood coaching (an approach in which many had been previously trained). On the final self-assessment, most participants described their strengths in more specific terms. They either included terminology that was specific to the course content or were able to reflect more deeply on their own practices. Most commonly listed strengths on the final self-assessment included: 1) using more reflective conversation to explore the caregiver's prior knowledge to know where to begin for intervention, and 2) facilitating more opportunities for caregiver practice with feedback during the visit. Participants also mentioned additional strengths such as more easily using collaborative problem-solving, more often discussing daily routines with caregivers, building relationships with families, and increased knowledge of adult learning principles.

The challenges reported most frequently by participants on the initial self-assessment focused on facilitating caregiver practice in real time during EI visits. Participants reported initial challenges with engaging caregivers who were difficult to engage, collaborating during daily routines, and practicing intervention strategies "in the moment." Participants also reported being challenged to ask questions to facilitate reflective conversation, provide feedback to caregivers, and increase caregivers' understanding of intervention. Later in the training course, participant challenges ranged across implementation of the four EI adult learning strategies. The most frequently mentioned challenges on the final self-assessment related to the use of collaborative problem-solving and allowing time for the caregiver to participate in developing intervention strategies, rather than the service provider immediately instructing the caregiver. Participants also mentioned struggles with facilitating caregiver practice during daily routines and remembering to ask open-ended questions to engage in reflective conversation. From the initial to the final self-assessments, participants reported fewer challenges and those that were reported suggested that participants were continuing to attempt to apply what they had learned in the course.

Similarly, all participants reported plans for improvement of professional practices. Initially, these plans were most likely to address: 1) using reflective conversation to explore the caregiver's prior knowledge; 2) asking more open-ended questions; 3) improving opportunities for caregiver practice with feedback; 4) improving joint planning; and 5) improving overall practices or coaching skills. Other plans mentioned by participants focused on improving the context of intervention. Participants mentioned the desire to facilitate more discussion with caregivers about their daily routines, helping them participant in planning for intervention, and joining them during their daily routines to practice implementing intervention with the child. On the final self-assessment, plans for improvement appeared to be more reflective and written in more depth. More specific plans were mentioned, with the most commonly described goals being: 1) supporting more caregiver reflection; 2) asking more open-ended questions; 3) allowing for more practice opportunities for the caregiver and child; 4) increasing time spent in collaborative problem-solving with the caregiver; 5) visiting families during their natural routines; 7) improving joint planning by using tools such as written note cards to record the plan with the family or sending texts during the week to check in with them; and 8) providing better feedback to caregivers after practice opportunities. By the final self-assessment, participants seemed to be more adept at identifying specific skills and strategies they wanted to improve. Their final plans also reflected a shift in focus to how they could better support caregiver learning and continue to apply what they had learned in the training course.

**Summary.** Analysis of social validity data suggest that participants perceived the training course as beneficial and as responsible for identified changes in their professional practices. Participants reported being highly satisfied with the training course and liked the interactive format which allowed them to receive embedded support and feedback on their immediate implementation of what they were learning. Across all social validity measures (e.g., participant survey, follow-up interview, and initial and final self-assessments), participants reported benefits of the self-reflection required of them during the course, noting that they gained a deeper understanding of their own professional practices and how to better support caregiver learning during EI visits. Participants reported that they were able to apply the four EI adult learning strategies in their work and use the knowledge gained from the content sessions to reflect on their prior knowledge about early childhood coaching practices. Participants commented that exploring adult learning in EI allowed them to gain a deeper understanding of coaching,

including how and why supporting caregiver learning is important to the child's developmental success. All participants reported that they actively used what they were learning during the training course and would continue to use the strategies they learned in their work with families.

## **Implementation Fidelity**

Procedural fidelity was also measured during the delivery of the training course to determine if established procedures for conducting the interactive webinar and embedded support sessions were followed. Checklists for procedural fidelity were developed by the researcher/trainer and were completed during each session by an observer who was an EI professional development specialist with Virginia's comprehensive system of personnel development (CSPD). Based on analyses of the completed checklists for five out of six sessions, procedural fidelity across both types of sessions was 100%.

### Conclusions

Results of this research suggest that the hypotheses stated in Chapter 1 were correct, at least for most participants. The first hypothesis focused on practice and stated that:

Completion of a 6-week multi-component, technology-mediated inservice training course and a single follow-up interview will increase the use of four EI adult learning strategies by 10 inservice EI service providers, when 45 minute pre- and post-training coded video recordings of intervention sessions with families are compared.

Based on analysis of pre-post video submissions from five participants, this hypothesis can be accepted. An increase in the use of the four EI adult learning strategies was noted following the completion of the training course. This conclusion does not necessarily include the completion of the follow-up interview because these interviews were conducted for some participants shortly after they submitted their post-training video. This occurred because it took longer to schedule some final interviews than expected due to scheduling conflicts with participants. Because four participants were unable to submit their pre- and/or post-training videos, it was not possible to determine how completion of the training course affected their use of the target strategies in the field.

The second hypothesis, which targeted knowledge acquisition, stated that:

Completion of a 6-week multi-component, technology-mediated inservice training course on applying adult learning to EI will increase inservice EI service providers' knowledge of five adult learning principles and their application of associated EI adult learning strategies during visits with families, as measured when results of a 20-question preposttest knowledge measure are compared.

This hypothesis can be accepted based on the results of the statistical analyses of the pre- and post-training knowledge measure. Analyses revealed that participants' knowledge of adult learning principles and the application of associated EI adult learning strategies during visits with families increased following completion of the training course. This increase was statistically significant (t = 4.299, p = .003) with very large effects (d = 1.487). Across knowledge measure items, increases in knowledge related to adult learning were also statistically significant (t = 3.600, p = .007) with very large effects (d = 1.772), more so than increases in knowledge related to coaching and general EI recommended practices, which was not significant.

The final hypothesis was related to participant perceptions of training effectiveness. It stated that:

Inservice EI service providers will perceive the multi-component, technology-mediated inservice training course which includes embedded support as an effective means of

developing their knowledge of adult learning principles and their ability to foster caregiver learning with the use of four EI adult learning strategies during intervention visits, as measured when the results of an investigator-developed, 12-item social validity survey, one follow-up interview per participant two weeks post-training, and initial and final self-assessments by participants are compared.

Based on qualitative analysis of social validity data, this hypothesis can be accepted. Participants perceived the training course as effective in helping them develop their knowledge of adult learning principles and apply this knowledge to their practices in the EI field. They reported gaining a deeper understanding of and increased skills in supporting caregiver learning through participation in interactive webinar sessions and embedded support sessions and through immediate application of what they were learning. They also noted the benefits of the format of the training course, which allowed them to actively participate in learning and reflecting on new content, apply it immediately in their work, and receive feedback and support on their application during the training course.

Results of this research suggest that this training course, which was conducted with the highest levels of procedural fidelity, offered participants a viable and beneficial option for inservice professional development. Of the five participants who submitted pre-post video pairs, four were able to increase their use of the target strategies taught during the course. All participants showed knowledge gains and all reported that they were able to use what they learned immediately with families on EI visits. Participants reported being highly satisfied with the course and appreciated the active learning and self-reflection required to help them: 1) better plan for interactions with caregivers, 2) apply strategies that targeted caregiver learning during EI visits, and 3) develop a deeper understanding of why this is important.

#### **CHAPTER 5**

# DISCUSSION

#### **Chapter Overview**

To address the need for high quality, accessible professional development in early intervention (EI), a multi-component, technology-mediated inservice training course was designed, delivered to EI service providers, and evaluated for effectiveness. This training course employed a new format, which included interactive webinars and embedded support sessions facilitated at a distance via technology. This format and the delivery of content integrated the seven key features of effective professional development, as described by Dunst (2015), which emphasizes supporting participants' active participation and reflection, providing embedded opportunities for practice, and facilitating ongoing support to assist participants with integrating what they learn into their professional practices. Research was conducted on the delivery of this training course to determine if this format for training had a positive effect on participants': 1) use of four EI adult learning strategies (e.g., reflective conversation, caregiver practice with feedback, collaborative problem-solving, and joint planning) during visits with caregivers; 2) acquisition of knowledge about adult learning principles and their application to EI; and 3) perceptions of the training's effectiveness. This chapter examines the findings of this research according to best practices in professional development, as described by the National Professional Development Center on Inclusion (2008) and Dunst's (2015) key features of effective professional development model. Implications for practice and limitations of the current research are discussed in terms of how these findings may inform future research and practice related to EI professional development.

## Introduction

To meet the federal requirement in Part C of the Individuals with Disabilities Education Act (IDEA, 2004) for a comprehensive system of personnel development (CSPD), states must organize and provide professional development for inservice early intervention (EI) service providers. This requirement ensures state-level EI programs have access to training so that EI service providers are "fully and appropriately qualified to provide early intervention services" (IDEA, 2004, §303.118) to infants and toddlers with developmental delays and disabilities and their families. States determine how to meet his requirement, and because of the state-level autonomy in determining funding and staffing priorities, there are differences in how this requirement is met across the country (Bruder, Mongro-Wilson, Stayton, & Dietrich, 2009). This has led to an inconsistent level of professional development available to service providers in the EI field across the country (Buysse, Winton, & Rous, 2009; Dunst, 2015; National Professional Development Center on Inclusion, 2008).

Section §303.118 of IDEA (2004) also states that the activities of a CSPD may include, among other things, "training personnel to support families in participating fully in the development and implementation of the child's IFSP" or Individualized Family Services Plan. Current research and evidence-based practices in EI suggest that services that target caregivers as the primary interventionists in their children's lives may be most effective (Kemp & Turnbull, 2014; Raab, Dunst, & Trivette, 2010; Rush & Shelden, 2011; Woods & Brown, 2011; Woods, Wilcox, Friedman, & Murch, 2011). This aligns well with the Division for Early Childhood (DEC) Recommended Practices (2014) and the mission and key principles of EI (Workgroup on Principles and Practices in Natural Environments, 2008), which emphasize the service provider's efforts to assist caregivers in enhancing the child's development during frequently occurring daily activities and routines. Supporting caregivers as primary interventionists requires that EI service providers have knowledge of adult learning and how best to support caregivers in learning to implement intervention strategies with their children both during and between service provider visits (Brown & Woods, 2012; Childress, 2015; Dunst & Trivette, 2010, Dunst, Bruder, & Espe-Sherwindt, 2014; Rush & Shelden, 2011; Salisbury & Cushing, 2013; Trivette, Dunst, Hamby, & O'Herin, 2009; Woods et al, 2011). Because many service providers enter the EI field with little knowledge of how to support caregiver learning (Snyder, Hemmeter, & McLaughlin, 2011), additional training is often needed at the inservice level to ensure that providers have what they need to provide effective intervention.

This research was designed to address the needs of both state-level training programs and program-level EI service providers. Regarding state-level needs, the training course evaluated for this research was designed to be of short-duration (6 weeks) and require minimal staff support (one trainer). The course was provided via technology so that EI service providers from across the state of Virginia would not be required to travel or miss significant time from work to complete it. Training sessions were offered in the late afternoon, after most EI visits would typically be completed, so that provider schedules would not be disrupted. Service provider participants were required to have an internet connection with access to a computer and telephone for audio, and were required to record two intervention visit videos using their own technology, but were otherwise not required to acquire any training materials. Participants received guidance in completing these requirements from the researcher/trainer before, during, and after the training course to make completing it as easy as possible. After the training course was completed, each participant received a certificate of completion that could be used toward

their state-level EI re-certifications, thereby benefitting both the participant and the Commonwealth of Virginia.

Training course content was developed to address the need for additional inservice training in how to support caregiver learning during EI visits. This topic was identified as important based on current recommendations in the EI literature calling for a shift in the understanding of the role of the service provider, from a "teacher" or "therapist" for the child to coach and consultant to the caregiver (McWilliam, 2010). Course content focused on how EI service providers can partner with caregivers, in the family's natural environment, to explore learning opportunities for the child that occur during everyday activities and routines. Participants in the training course learned how to apply adult learning principles and components in their work by using four EI adult learning strategies to support caregiver learning during visits. These strategies included: 1) reflective conversation; 2) caregiver practice with feedback; 3) collaborative problem-solving; and 4) joint planning and were grounded in adult learning theory and the work of Friedman, Woods, and Salisbury (2012) and Rush and Shelden (2011).

Course content was provided using a new method of training which was also grounded in adult learning theory and recommendations from the literature review described in detail in Chapter 2. Findings from this review suggested that additional research was needed in technology-mediated inservice professional development that includes ongoing support for EI service provider participants. It was also recommended that new research specifically describe and examine the "who," "what," and "how" of professional development, as outlined by NPDCI (2008) to determine which core components are associated with positive outcomes for participants, and ultimately, the children and families with whom they work. As noted in the literature review, additional research is needed that describes the "how" of professional

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development in detail, specifically how professional development is delivered across time and with ongoing support (Bruder, Dunst, & Wilson, 2013; Buysse et al., 2009; Cook & Odom, 2013; Dunst, 2015; Odom, 2009; Penuel, Fishman, Yamaguchi, & Gallagher, 2007; Snyder et al., 2011). It was suggested in the review that Dunst's (2015) model of evidence-informed inservice professional development for early childhood practitioners could be used as a format for describing "how" a training activity was facilitated. The format and content of the current training course and research project were designed to align with these recommendations to ensure that findings were thorough, informative, and could be used to understand the relationship between completion of the professional development activity and participant outcomes.

## **Training Course Design and Delivery**

What follows is an examination of the training course design and delivery against the NPDCI (2008) core components and the seven key features of Dunst's (2015) model for evidence-informed inservice professional development.

#### **NPDCI's Core Components of Professional Development**

According to NPDCI (2008), the "who" of professional development describes the characteristics of the learners and the contexts in which they will use what they learned. Information was gathered from participants in this training course about their: 1) Virginia EI certification status, 2) locality in which they worked, 3) professional role, 4) number of hours they worked each week in EI, and 5) number of years of EI experience. All participants were fully certified to provide EI services under the Infant and Toddler Connection of Virginia. Participants worked in localities across the state, including the northern, southwestern, and central regions. Most of the common participant roles seen in the field were represented, including physical therapist, speech-language pathologist, and developmental services provider.

Most participants worked 40 or more hours each week and most had extensive experience providing EI services. All participants were female, and all completed or attempted to complete all requirements of the training course and research project.

Regarding the "what" component, this training course content focused on the application of adult learning principles and components to EI service delivery. Participants were taught about five adult learning principles and three adult learning components as they applied to supporting caregiver learning during EI visits. This information was also used to help participants gain a deeper understanding of why supporting caregiver learning was an essential part of their work. Participants then learned about four EI adult learning strategies and how to use them during visits to increase the capacity of caregivers to successfully implement intervention strategies with their children both during and between visits.

"How" the training was conducted was determined by the resources available to the state CSPD system, the needs of participants, and the recommendations in the literature. In line with NPDCI (2008) recommendations, this course was provided at a higher intensity than a single workshop, was sustained across six weeks for the course and up to two additional weeks to conduct the final interview, and included ongoing, embedded guidance and feedback on the application of what was learned during and after the training course. The course was facilitated by a single trainer with extensive experience as an EI service provider and professional development consultant with knowledge of the training needs in Virginia. Blackboard Collaborate was used to host the training course sessions online, and teleconferencing was used to provide audio. Both resources were readily available and commonly used by Virginia's CSPD. The decision to provide this course at a distance was made in response to feedback from service providers and system leaders who expressed a need for training that was easily accessible and did not require travel or extended time away from work. Leaders and service providers had also expressed interest in adult learning following statewide training on coaching and several conference sessions on adult learning provided by the trainer and a colleague at two previous state conferences. This interest, along with recommendations in the EI literature for professional development that addresses how to build the capacity of caregivers to intervene with their children, provided direction for what content would be trained and how training would be provided. Early intervention professional development literature, such as work from Dunst (2015) and others (Brown & Woods, 2012; Bruder, 2010; Dunst & Raab, 2010; Dunst & Trivette, 2009; Dunst et al., 2011; Kyzar et al., 2014; Maturana & Woods, 2012; Trivette et al., 2009; Trivette, Raab, & Dunst, 2012), was also used to determine how best to facilitate such a training.

#### **Dunst's Model of Evidence-Informed PD**

Dunst's (2015) model of evidence-informed professional development was used as a guide when developing the format for this training course. This model identifies seven key features of inservice professional development that should be included when aiming to change the knowledge and skills of professionals related to EI practice. Each of the following key features was considered when designing and facilitating this training course:

1) Explanation and illustration. To explain and illustrate the relevance of adult learning to EI, the field's evidence-based practices were reviewed in the first training course session. Information about the mission and key principles of EI were shared (Workgroup on Principles and Practices in Natural Environments, 2008) and images were used to illustrate intervention that applies these key principles. Participants were then challenged to compare their current practices against this illustration for self-reflection purposes. Each adult learning principle was also

illustrated and explained using simple descriptions and images that translated the principle from theory to its application during EI visits. Similarly, the adult learning components (e.g., planning, application, and deeper understanding) were consistently illustrated throughout the training course as cogs on a wheel, which seemed to help participants remember how these components interacted to support caregiver learning. In fact, participants demonstrated this memory on the post-training knowledge measure. The item on the measure requiring participants to identify these three components was the only item with a statistically significant change and very large effect size from pre- to post-training; all participants answered incorrectly prior to training and eight answered correctly post-training. To help participants connect the adult learning principles and components with the EI adult learning strategies, brief case studies with images were used to facilitate understanding. These case studies were also used to facilitate immediate application of learning during sessions and self-reflection from participants as they compared the actions of the service provider in the case study to their own actions during visits.

2) Job-embedded opportunities. Similarly, the case studies used in the training course were used as job embedded opportunities to simulate actual practice during training course sessions. Each interactive webinar session included discussion of at least one case study. Participants were invited to share their own experiences, which were discussed in chat as real world examples of how these adult learning principles, components, and EI adult learning strategies could be applied. Following each interactive webinar session, participants were emailed a self-assessment to complete and share during the next embedded support session. These self-assessments required a high level of self-reflection about what was being learned and the application of this information in participants' daily work between sessions.

#### 3) Use of different types of professional development practices for learner

engagement and reflection. Two different session types, interactive webinars and embedded support sessions, were intentionally alternated across the six weeks of the training course to offer participants multiple opportunities and means of learning new information. The interactive webinars were content-rich sessions, during which information was taught using visually engaging Power Point slide decks. Interactive methods and webinar tools were used to engage participants during the sessions and help them reflect on their prior knowledge of the content and how it applied to their current practices. The embedded support sessions were designed so that participants received support on their immediate use (between sessions) of the strategies they were learning. This support was provided verbally and by email as needed between sessions. Active engagement was facilitated during all sessions using open-ended discussion and reflection questions, chat and voiced conversations to reflect on experiences and problem-solve challenges, and the processing of insights from learner self-assessments.

4) Ongoing use of coaching, mentoring, or performance feedback. Coaching was used during the sessions, particularly the embedded support sessions, to help participants think about their work and how to apply what they were learning. The trainer guided these discussions, but also encouraged participants to support each other. Performance feedback was provided during the embedded support sessions when each participant was asked to share something she learned or an insight from the previous week's self-assessment. Participants often shared examples of their work or described how they were using what they learned during visits with families. Feedback was then provided to help them reflect on what they did, why they did it, and what they plan to do differently next time to improve their professional practices. 5) Ongoing follow-up. Support was provided to participants throughout the six weeks of the training course. This support was embedded in the course in order to help them reflect on their work with caregivers and their application of the EI adult learning strategies. According to adult learning theory, adult learners learn best when information is grounded in prior knowledge, immediately relevant and useful, practiced in context and in real time, and when feedback is received on the learner's performance. Embedding ongoing follow-up in the training needs of participants. This ongoing support was primarily provided by the trainer, but participants also supported one another in their comments. One additional contact point, the final interview, was also provided after the training, as another means of providing ongoing support. During the interview, participants were invited to discuss their experiences as learners and were provided with feedback and support about how they planned to continue using what they learned.

6) Sufficient duration and intensity with multiple opportunities to practice.

Participants attended a training course session each week for 1.5 hours for six weeks. They were also required to complete readings and/or self-assessments between sessions. At the end of each session, participants were reminded to practice what they were learning in their intervention visits with families over the rest of the week. Participants were asked to share their experiences and reflections on their practice during sessions. While participants could choose who to practice with, many participants shared that they were using what they learned with all of the families with whom they worked.

**7) Includes all or most of these six key features.** As recommended by Dunst (2015), all of these key features were included in the training course format.

Since this model of professional development was only published two years ago, research is needed to determine its effectiveness. This research provides an example of a multicomponent, technology-mediated inservice training course that was designed using this model to ensure that the course format was informed by the available evidence in how to best support participants' learning. This research and the detail provided about the design and delivery of the training course will also add an example of an inservice professional development activity that intentionally addressed the "who," "what," and "how" of training by including a thorough description of these core components. Based on the results of this research, which will be discussed in detail next, it appears that this format was effective in helping participants learn to use four specific strategies (e.g., reflective conversation, caregiver practice with feedback, collaborative problem-solving, and joint planning) to support caregiver learning during EI visits.

#### **Discussion of Research Findings**

Inservice training was provided to nine EI service providers in Virginia on the application of adult learning principles and components and the use of four EI adult learning strategies (e.g., reflective conversation, caregiver practice with feedback, collaborative problem-solving, and joint planning) designed to support caregiver learning during intervention visits with families. Quantitative data was gathered from participants about their use of the EI adult learning strategies and their knowledge of the course content before and after the course. Pre- and posttraining videos were submitted to document participants' use of the strategies in the field with families, and pre-and post-training knowledge measures were completed to examine knowledge acquisition of adult learning principles, components, and strategies. Qualitative data was gathered about participants' perceptions of the effectiveness of the training course via selfassessments, a social validity survey, and a final phone interview. Together, these data provided a view of the impact of this training initiative on participants' abilities to use, understand, and reflect on how they support caregiver learning during EI visits.

# **Use of EI Adult Learning Strategies**

Increases in the total frequency of use of all four EI adult learning strategies were noted across the smaller group of participants who successfully submitted pre- and post-training videos following the training course. The greatest changes in total frequency from pre- to post-training across all participants were in the use of caregiver practice with feedback (increase of seven occurrences across all participants from pre- to post-training) and collaborative problem-solving (increase of six occurrences across all participants from pre- to post-training). When these data are examined by individual participant, it should be noted that only four of the five participants actually demonstrated increases in the frequency of use of at least one EI adult learning strategy. The difference between individual data and within subjects data is likely due to the large increases in frequencies noted for some participants, such as the increase of 11 occurrences from pre- to post-training noted for Participant 5. Overall, though, participants reported similar improvements during their final interviews and on their final self-assessments. Several participants indicated that they felt that, following the training, they had more structure to their visits and were able to use strategies more intentionally to improve the caregiver's active participation. Several participants specifically mentioned these strategies, as well as reflective conversation, as having improved during the interview when asked about their use of what they learned following the training. These participants reported increased comfort with facilitating caregiver practice, providing feedback, and helping caregivers problem-solve about how to use intervention strategies. Similarly, on the final self-assessment, most participants indicated strengths related to facilitating caregiver practice with feedback. These strategies are designed to

encourage the caregiver's active participation, but require that the service provider understand her responsibility in facilitating it. These strategies remind service providers to view themselves as facilitators of caregivers' learning to ensure that caregivers gain a deeper understanding of how, why, and when to implement intervention strategies with their children; this is different from the common view of the EI service provider as a teacher or therapist for the child (Fleming, Sawyer, & Campbell, 2012; Salisbury & Cushing, 2013; Salisbury et al., 2010). This change in perceptions and practices may also have had a positive impact on caregivers, as noted during the final interviews when all participants reported observing improvements in caregivers' level of engagement during visits. Anecdotally, the video coders also shared similar observations following coding of all videos. Whether or not the use of these strategies affects caregiver participation during visits was not formally evaluated during this study but should be a subject of future research.

### **Knowledge Acquisition**

Prior to completing the course, participants reported on the social validity survey that they had limited to moderate knowledge of adult learning strategies. After completing the training course, all participants reported that they strongly agreed that their knowledge and skills related to supporting caregiver learning during EI visits had increased. Most participants strongly agreed that they felt more confident about their knowledge of adult learning as it applied to their work.

This perceived increase in knowledge was confirmed by the results of the statistical analyses on the pre-post knowledge measure scores. Participants showed a statistically significant gain in knowledge following participation in the training course, with very large effects. In particular, participants appeared to have acquired the most knowledge about adult learning principles, components, and strategies as they apply to EI service delivery, which was the focus of course content. It is interesting to note that previous training had been provided across Virginia in early childhood coaching and included strategies that overlapped somewhat with those taught in the training course. Based on the results of the pre-post knowledge measures, it was apparent that participants came to the training with prior knowledge of coaching and recommended practices in the EI field. This prior training and related knowledge may have provided them with a firm foundation on which to build their new knowledge and develop the deeper understanding of how to support caregivers that was reported on the social validity survey and in the final interview.

## **Perceptions of Training Effectiveness**

Participants reported that they perceived the training to be effective in increasing their knowledge and skills related to supporting caregiver learning during EI visits. All participants rated the overall training as "excellent" and were highly satisfied with the course. They either strongly agreed or agreed that the format of the training worked well for them. The format was rated highly throughout the survey. Among those who commented, participants appeared to like the length of the course, although several participants suggested that they would have liked for the course to have been longer than six weeks. All participants strongly agreed that they liked the interactive nature of the training course and that the format, which included both interactive webinars and embedded support sessions, was more effective than a single workshop. Participants reported finding the embedded support sessions, in particular, to be an effective means of receiving feedback and support on their immediate use of what they were learning. They benefited from hearing from other EI service providers, specifically about their experiences, insights, and suggestions for supporting families. When asked to compare their

experiences completing this training course with others taken online, most participants rated the current experience as excellent. Participants who chose to comment on this experience described how they liked the increased interaction and discussion opportunities offered during this course.

Participants appeared to like the organization of the course. Several participants indicated that they liked the small group size, length of course sessions at 1.5 hours, and breaks offered during sessions. They also liked the pace of the training course, the alternating session types, and many opportunities for self-reflection. They found this format to be beneficial for helping them achieve a deeper understanding of how and why to target caregiver learning during visits. Participants appeared to enjoy opportunities to engage with others using the webinar chat tool and the conference call line. Increased confidence and comfort as well as improved understanding of coaching were also described by participants as a result of engaging with others during the course.

All participants strongly agreed that the information taught was practical and immediately useful in their work with supporting caregiver learning. All participants reported actively using what they learned with families during the follow-up interview. They also reported using what they were learning during the training course. All participants noted that their perceptions and practices had changed as a result of completing the course. When asked if they would continue to use what they had learned, all participants strongly agreed that they would.

### **Implementation Fidelity**

In addition to the evidence of training effectiveness, the fact that implementation (procedural) fidelity reached 100% across all monitored training sessions is a strength of this study. Researchers have noted that implementation fidelity is often not reported or not reported sufficiently in professional development studies (Barton & Fettig, 2013; Dunst et al., 2013).

Without clear reporting of how implementation fidelity was monitored, it is difficult to understand how training outcomes were achieved. Replication of a professional development activity or associated research is also challenging without this information. The fidelity measures for this study were developed by the researcher/trainer and have not yet been tested when used by other trainers, but future replication of this research could address this limitation.

#### Limitations

Limitations for this research were initially discussed in Chapter 3 as well as plans for addressing those that could be managed. First, as anticipated, participants in this training course came from a convenience sample of EI service providers who chose to participate. It was not possible to randomly select participants for this professional development activity as this would not have been aligned with adult learning theory, which states that learning is more likely to occur when the information is immediately relevant and useful. Randomly selecting training participants from the total population of EI service providers in Virginia could have resulted in participants who were not interested in the content or not able to use what was being taught. Without random selection, it is possible that the participants could have differences in their knowledge, experience, or motivation from those who did not chose to participate.

Second, since participants selected the families with whom they worked, it is possible that the characteristics and interaction styles of the caregivers affected the study outcomes, especially on the video submissions. While this is possible, it is interesting to note that for the one participant (Participant 7) who recorded her two videos with different families, her total frequency of use of the EI adult learning strategies only varied by one occurrence, and the frequency of use of individual strategies was consistent, with the exception of one additional occurrence of reflective conversation with the family in the post-training video. The caregivers in
these videos were observed to be very different in terms of their levels of engagement with the service provider and with their child. This suggests that using these strategies may be more a function of the service provider's skill, rather than the caregiver's interaction style. Future research is needed to explore this observation further.

It was suggested in Chapter 3 that a third limitation would be the fact that participants chose which videos to submit. Based on feedback from participants, several of them did not watch the videos they submitted and many only recorded two videos, which was the minimum requirement for the study. Therefore, it is unclear as to whether this anticipated limitation actually had any effect on the study results. A fourth limitation, however, may have affected the data collection. It is possible that the families who consented to be recorded may be different from the larger population of families in EI. This could not be determined from this study as no data was collected about family characteristics to honor the preferences of those families who volunteered. It is also not known if the presence of the video camera affected the provider-caregiver-child interactions, which is also a potential limitation in any research that includes recording of real time activities.

The fifth limitation relates to the small group size of nine participants who completed the training course. Initially, three additional service providers expressed interest in participating in the course, but withdrew either before the first session or shortly after the first session. These participants had conflicts with scheduling and other commitments which interfered with their abilities to complete the training course. While the group could have been somewhat larger had these participants stayed in the course, the decision to keep the group size small was intentional. A smaller group size is recommended by Dunst (2015) to facilitate learning during inservice professional development, especially when training emphasizes self-reflection. Managing

technology-mediated interactions with a smaller group is also easier and ensures more individualized attention for participants from the trainer. However, without further replication, the smaller sample size limits the external validity of the findings (Leedy & Ormrod, 2013). Nonetheless, the smaller sample size did not affect the detection of statistically significant differences between the pre- and post-training knowledge measures, as suggested in Chapter 3. As noted in Chapter 4, these differences were very large, which was necessary to detect them with such a small sample.

Additional limitations anticipated in Chapter 3 related to participant self-selection and researcher bias. Despite the reality of participant self-selection, a sample of participants from three (e.g., southwestern, northern, and central Virginia) of the five regions of the state were represented. Providers of three of the four main EI services provided in the Commonwealth (e.g., physical therapy, speech-language therapy, and developmental services) who had differing levels of experience were also represented. However, all participants had previous training in early childhood coaching and recommended EI practices which they applied during training, as noted on the pre-post knowledge measure and in comments during the training course and on the selfassessments. This common knowledge may have affected how these participants were able to learn and use the information taught, and may be different from other service providers who do not have this prior knowledge. Researcher bias was still inherent in the development and delivery of the training course, as the researcher was also the trainer and an employee of Virginia's CSPD team. The researcher/trainer had intimate knowledge of the needs of participants from a statewide and locality-specific perspective, knowledge of the state's approach to providing EI services, and experience working in EI in the Commonwealth. This level of knowledge and experience may be difficult to replicate if this course is provided again in the future with another

trainer. With that in mind, further research should control for characteristics of different trainers to see if these characteristics affect training outcomes.

The internal validity of study measures was also anticipated to be a possible limitation. As previously mentioned, the knowledge measures, social validity survey, and the selfassessments had not been piloted before this study. Additional research is needed on these measures to determine their validity. Analysis of the pre-post knowledge measure suggests that it was an effective measure of knowledge gained from the course, but the analysis of specific items suggests that several items (e.g., Q2, Q9, Q11, Q13, Q14, Q16) should be reviewed before the measure is used again as they were either answered correctly on both measures by all participants or answered incorrectly by all participants on both measures. Similarly, the social validity survey should be reviewed for revisions following this pilot use to determine if edits are needed. After using the self-assessments and receiving feedback from participants, it was recommended that the Likert rating scale be revised to make it easier to answer. Some participants struggled to conceptualize how to answer items as "always," while others felt that clarification was needed as to whether they should rate their practices considering only the family with whom they were recording their videos or all families with whom they worked. One participant also suggested making the form mobile friendly so that it could be more easily viewed on a tablet. These suggestions will be taken into account before any attempts to replicate the training course.

After completing the facilitation of the training course and the data collection, additional limitations become apparent. Data analysis of the video submissions was likely limited by the need to delete video content to match the shortest video submitted. This required that more than half of some videos were deleted. This content was deleted from the beginning of most videos to

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preserve the joint planning which typically occurs toward the end of an intervention visit. However, several videos were edited by deleting content toward the end of the video because participants could not be easily seen or heard. Decisions about deleting content were made as consistently as possible, but due to the wide range of video lengths and the importance of preserving as many provider-caregiver interactions as possible, inconsistencies did occur. It is possible that these inconsistencies may have affected the results of the video coding. It is possible that the deletion of this content reduced the number of occurrences of the EI adult learning strategies that were coded, particularly with joint planning. If this study is replicated, it may be beneficial to consider further instructions for participants to clarify how to record their videos to ensure that the videos meet the initial proposed standard of at least 45 minutes in length.

A final limitation to data collection relates to how the follow-up interviews were conducted. These interviews occurred by phone during a conversation between each participant and the researcher/trainer. It is possible that participants provided more positive feedback during this interview because they were speaking with the researcher/trainer rather than a neutral party. Interviews were conducted as objectively as possible using a consistent list of questions, and some participants did provide constructive feedback about difficulties, particularly related to experiencing initial discomfort with the webinar tools and with participating in the embedded support sessions, and finding the video submissions stressful. Participants also provided feedback about how to improve the course. Despite being offered the opportunity to provide constructive feedback, it is possible that the relationship established during the training course between the researcher/trainer and the participant could have affected the type of feedback provided by participants. Therefore, future research on this training course should include a neutral third party who could conduct the follow-up interviews.

#### **Recommendations for Future Research**

The present study revealed the effectiveness of a new model of multi-component, technology-mediated inservice professional development for EI service providers. Results of this research suggest that training provided across time and at a distance can be effective in increasing the knowledge and improving the professional practices of EI service providers. Most notably, this training model included ongoing support embedded during the training and high levels of participation and self-reflection for learners, which are often missing from more traditional training. Additional research is needed to support the effectiveness of this new method of training. Replication of this project, with the enhancements suggested to address limitations, could determine if this method of training has benefits for larger groups of service providers, providers in fields outside of EI, or service providers in other states. Replication is also warranted to determine if other trainers are able to use this method and achieve positive outcomes for learners. Further, future research should also examine the efficacy of using this training method to teach different content.

Since this is the first documented use of a multi-component, technology-mediated inservice training course that included embedded support, additional research is needed to support the effectiveness of providing ongoing coaching and performance feedback during training through dedicated sessions designed to promote self-reflection and provide performance feedback. Other studies have been conducted that described onsite mentoring during training (Dunst et al., 2011; Kyzar et al., 2014) or mentoring or other types of ongoing support at a distance following training (Behl, Houston, & Stredler-Brown, 2012; Maturana & Woods, 2012;

Watson & Gatti, 2012; Vismara, Young, Stahmer, Griffith, & Rogers, 2009) for EI service providers, but none have yet been published that have these supports embedded in training as described in this project. The fact that this training course was also technology-mediated bears mentioning as this means of reaching participants may be a viable option for many state's CSPDs. This study's significant results suggest that this training was highly effective when provided at a distance via technology. Two participants in this study suggested that they would have liked to have "seen" their fellow participants and missed the typical face-to-face interactions experienced in workshop settings. Providing face-to-face contact is possible using distance technology, such as webcams, so future research could examine whether or not providing face-to-face contact has any effect on the outcomes of this training, or if it simply provides a level of comfort for some participants. It would also be interesting to add an additional follow-up session and/or video submission requirement, perhaps three months posttraining, to determine whether or not participants maintain their knowledge and continue to use what they learned during visits with families. Hopefully, with future research, this method of multi-component, technology-mediated training will be useful to those who provide professional development at a distance that is designed to improve the practices of service providers in the EI field.

Finally, future research should address a need in the EI field for professional development that improves not only professional practices, but child and family outcomes as well. This research study did not gather data to examine the effect of completion of this training course on child and family outcomes. This data was not gathered because families were reluctant to volunteer if any information about them would be collected or shared. It is strongly recommended that replication of this project include this additional avenue of investigation.

Future research should plan for gathering data about changes in child and family behaviors in ways that protect family comfort and confidentiality. This data could include information about caregiver-child interactions, perceptions of confidence and competence, frequency of the family's use of intervention strategies with the child in the family's daily routines, and child and family quality of life. The purpose of training is to improve practices, which are then used by service providers when they interact with children and families during service delivery. Ultimately, if EI services are successful, children not only display developmental skills, but families are more confident in meeting their children's needs between visits and find that their quality of life improves. For a complete understanding of the effects of high quality professional development, it is imperative that child and family outcomes are considered.

#### **Implications for Practice**

This focused effort to embed ongoing support in a multi-component, technologymediated inservice professional development activity has not been previously described in the EI literature, but was based on most current recommendations in professional development (Dunst 2015; NPDCI, 2008). Based on the findings of this study, it would be useful for trainers to consider how they can provide ongoing support during training when training is offered for more than a single session. This study suggests that providing ongoing support both during and after training, even with a single follow-up session, may be beneficial to help participants implement what they learn. Because of inconsistencies in when the final follow-up interview occurred and when final videos were submitted, it was difficult to ascertain the level of benefit of this session. However, based on recommendations by Dunst (2015) and others (Joyce & Showers, 2002; Snyder et al., 2012) that suggest that follow-up after training can be beneficial to generalization and maintenance of learning, it follows that including ongoing support both during and after training should be considered.

This training course occurred for a relatively short duration of six weeks, which is considerably longer than the most common professional development activities attended by EI service providers. While it is easier for trainers to provide a single workshop, it is not likely that this effort will improve practices (Bruder, Dunst, Wilson, & Stayton, 2013; Cook & Odom, 2013; Church, Bland, & Church, 2010; Dunst, Trivette, & Deal, 2011; Joyce & Showers, 2002; Odom, 2009), so a shift in thinking from what is easier to what is most effective is needed. As this study suggests, providing training that is multi-component in nature and occurs over multiple sessions can be accomplished at a distance and in a manner that removes the travel time and the costs associated with attending a workshop. This training course was provided using webinar software and teleconferencing that did have associated costs, but there are free versions of similar technology that could be used to provide training at a distance and minimize costs to a state's CSPD. Once this type of training format and curriculum are established, they can be easily replicated within a CSPD for additional participants by the same or other trainers. The time involved to implement this format of training may be outweighed by the positive effects of providing training that is aligned with evidence-informed practices for providing effective professional development.

If this training course were replicated, several recommendations can be made based on the experience of the trainer and feedback from participants. Several participants suggested that feedback on their videos would have been very helpful and would have made recording them more purposeful for professional growth. Replication of this project should include this component, but incorporate a self-assessment by participants on each video against a standard,

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namely a checklist designed to guide their reflections. This self-reflection could provide the foundation for coaching and performance feedback from the trainer. It would then be necessary to determine how to provide this feedback, via either a contact with each participant outside of the training course sessions or incorporating this feedback into sessions. Viewing and discussing the pre- and post-training videos could also offer participants the opportunity to reflect on their performance, progress, and plans for improvement.

Plans for improvement were important throughout this training course and were documented on the self-assessments. Several participants reported that they liked the requirement to develop this plan and the accountability that came with submitted it to the trainer and discussing it during the embedded support sessions. The trainer had originally planned to have participants type their plans on-screen at the end of the embedded support sessions too, but this was not necessary as all participants wrote out their plans on their self-assessments. It appeared that the act of writing the plan, discussing it, and knowing that it would be revisited later was enough to ensure that participants were actively engaged in addressing the plan between sessions. Because of this requirement for active participation and reflection during and between sessions, it is recommended that future training include an even smaller group of no more than eight participants. With nine participants, some sessions felt "tight" on time toward the end of the session, especially the embedded support sessions. This was noted by the trainer and some participants. Reducing the number of participants may free up the time needed to ensure that all participants have adequate time to participate. Based on additional recommendations from participants, future trainings should also include: 1) providing more information about the time commitment required outside of attending the sessions; 2) providing answers to the post-training

knowledge measure after all participants have completed it; 3) providing a resource and reference list; and 4) avoiding Wednesday afternoons for course sessions due to church activities.

Finally, an important consideration for EI professional development relates to the adult learning focus used to design and deliver this training. Adult learning theory was used both to design the training course to ensure that the five adult learning principles were addressed in the course format. Participants' prior knowledge was repeatedly accessed, course content focused on information that could be used immediately, case scenarios were provided to help participants practice using what they were learning in real contexts, and feedback was provided on participants' attempts to apply what they were learning between sessions. Likewise, these principles were also taught to participants to provide a foundation for how the EI adult learning strategies worked. Participants reported that gaining this knowledge helped them achieve a deeper understanding of how to coach caregivers and why integrating strategies to support caregiver learning is important in EI practice. Applying adult learning theory under the framework of Dunst's (2015) model of evidence-informed professional development is recommended when designing any training activity for EI service providers, or any other adult learners. Intentionally considering the needs of adult learners and how they attend to, process, remember, and use information they learn may be a key to successful training. Similarly, considering the learning needs of caregivers, who are also adult learners, in the EI context is also important because they also need to take what they learn and implement it successfully outside of the context of the intervention visit, which for them, is the training context. Consistent with recommendations in the EI literature (Bruder, 2010; Trivette et al., 2012; Woods, Wilcox, Friedman, & Murch, 2011), this research suggests that considering adult learning when designing training and when supporting caregiver learning during EI visits may be important

when changing the practices or actions of the adult learner is the goal. Professional development and EI practice have similar goals: to support the adult learner in building knowledge and using the skills associated with it for positive outcomes. Whether that learner is an EI service provider or a caregiver of a child with a developmental delay or disability, the results of this study suggest that integrating adult learning theory into the support provided to that learner may be beneficial to the outcomes of the learning process.

#### Conclusion

This research, in the level of detail described in this dissertation and in the strength of the results, adds to both the EI and professional development literatures by providing an example of a new, evidence-informed training course model that positively affected the professional knowledge and practices of training participants. This new model integrates what is known about how to support adult learning with practices for facilitating training at a distance via technology. This research also added an example of a professional development activity that used both the NPDCI (2008) core components and Dunst's (2015) model for evidence-informed professional development in its design and delivery. Most participants in this research who successfully submitted pre-post training video pairs demonstrated increases in the frequencies with which they used learned strategies. Based on the analysis of pre- and post-training video submissions from five out of nine (56%) participants who were able to successful submit videos, an increase in the total frequency of use of four EI adult learning strategies (e.g., reflective conversation, caregiver practice with feedback, collaborative problems-solving, and joint planning) was noted post-training. The greatest increases were found in the use of caregiver practice with feedback and collaborative problem-solving, both strategies that require the active participation of the caregiver during the EI visit. Analysis of results of the pre-post knowledge measure showed

statistically significant (t = 4.299, p = .003) and very large gains (d = 1.487) in knowledge related to training course content. In particular, a statistically significant increase (t = 3.600, p = .007), with a very large effect size (d = 1.772), was noted for participants' specific knowledge of adult learning principles, components, and strategies, which was the focal content of the training course. Participants also perceived the training format as beneficial to their professional development and reported being highly satisfied with their learning experience.

The findings from this research can be used by professional development specialists, researchers, and learners within and outside of the EI field to explore high quality training opportunities that change professional knowledge and practice. In a broad sense, this research provides an example of a multi-component, technology-mediated inservice training course that could be used as a model by professional development specialists and researchers in any field when designing and delivering training to a small group of learners. The findings of this research could be especially useful when training is designed to include both content sessions and opportunities for embedded support during training and follow-up support after training to promote learners' use of a field's evidence-based practices. More specifically, this multicomponent inservice training course provides states' CSPD teams in the EI field with an example of an inservice professional development activity that was provided across time (i.e., 6-weeks), used existing technology resources, required a high level of participation and self-reflection, and provided embedded support during training to positively impact the knowledge, skills, and perceptions of EI service providers. The methodology used for designing and delivering this training course closely followed recommended and evidence-informed professional development practices (Dunst, 2015; NPDCI, 2008) and was described in detail, which promotes replication by training teams and researchers within and outside of the EI field. Specific to the EI service

provider population, this research also suggests that training on the application of adult learning principles, components, and the use of EI adult learning strategies to support caregiver learning may have a positive impact on the application of these strategies and providers' understanding of the use of early childhood coaching during EI visits with families. Finally, service provider learners can use these findings when considering which trainings may be most beneficial in helping them reflect on their own practices and gain the knowledge and skills they need to provide the most effective services to the families they support.

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## **APPENDIX A**

# **Pre-Posttest Knowledge Measure**

# **Demographics**

Professional role: (Check all that apply.)

- a. Service coordinator
- b. Service provider (please specify)
- c. Local system manager/supervisor
- d. Other (please specify)

Professional training background:

- a. Early childhood special education
- b. Speech-language pathology
- c. Physical therapy
- d. Occupational therapy
- e. Other (please specify)

Current number of hours worked each week:

- a. less than 10
- b. 11-20
- c. 21-39
- d. 40 or more

Years of experience providing early intervention:

- a. 0-2 years
- b. 3-5 years
- c. 6-10 years
- d. 11+ years

# **Knowledge Measure**

- 1. Most effective adult learning experiences include which three components:
  - a. action, reflection, and joint planning
  - b. planning, application, and deep understanding
  - c. observation, planning, and implementation
  - d. application, feedback, and reflection
- 2. When service providers use coaching, caregivers are more likely to demonstrate:
  - a. Increased responsiveness and engagement
  - b. Increased ability to complete homework prescribed by therapist
  - c. Improved ability to use intervention strategies daily
  - d. Both a and c

- 3. When adult learners associate new learning with their \_\_\_\_\_, they are better able to store new information in long term memory.
  - a. daily routines
  - b. immediate needs
  - c. prior knowledge
  - d. observations

## 4. Adult learners want \_\_\_\_\_\_ their learning and performance.

- a. feedback on
- b. instruction about
- c. handouts to guide
- d. all of the above
- 5. Which is least likely to help caregivers apply what they learn during intervention visits:
  - a. discussing a plan for using strategies with the child
  - b. practicing using strategies with the child
  - c. observing the service provider interact with the child
  - d. none of the above
- 6. Tracy coaches Marlene as she practices holding Ella's hips to keep her stable in supported standing. Ella keeps bending her knees and trying to sit down instead of stand. Which strategy should Tracy use to support Marlene?

Which strategy should Tracy use to support Marlene?

- a. reflective conversation
- b. caregiver practice with feedback
- c. collaborative problem-solving
- d. joint planning
- 7. The two most important characteristics of an effective learning experience for adult learners are:
  - a. feedback and reflection
  - b. observation and coaching
  - c. joint planning and follow-up
  - d. active participation and reflection
- 8. Caregivers learn and remember most successfully when what they are learning is practiced:
  - a. in context and in real time
  - b. in the home with the child
  - c. after watching the service provider play with the child
  - d. all of the above
- 9. Caregivers have reported that the most helpful activity that occurs during the intervention visit is:
  - a. observing the service provider
  - b. problem-solving with the service provider
  - c. discussing successes from the week
  - d. learning how to play with the child

10. Adults learn best through active participation and \_\_\_\_\_\_.

- a. observation
- b. reflection
- c. practice
- d. discussion

11. The most important learning for the child happens:

- a. during intervention visits when the provider is there to give support
- b. between visits during daily routines and activities with family members
- c. during independent play
- d. while playing with toys
- 12. Patricia, Blane's mother, is frustrated because when she tries to put him in the car seat, he arches his back and cries. Which strategy should Emily, the service provider, use to begin coaching Patricia?
  - a. reflective conversation
  - b. caregiver practice with feedback
  - c. collaborative problem-solving
  - d. joint planning
- 13. To help caregivers plan for intervention, the service provider can:
  - a. model intervention strategies
  - b. observe the parent and child
  - c. share information
  - d. all of the above
- 14. Coaching in early intervention is considered to be:
  - a. a promising practice
  - b. well-defined in the research literature
  - c. less effective with child care providers
  - d. a key principle of EI
- 15. Anna asks Ms. Davis about what she already knows about how to help Aidan maintain his head control while sitting in the high chair. Anna is using:
  - a. reflective conversation
  - b. caregiver practice with feedback
  - c. collaborative problem-solving
  - d. joint planning
- 16. To help the caregiver problem-solve during the visit, the service provider can:
  - a. suggest solutions to see if the caregiver wants to try them

b. ask about how the caregiver thinks she can adapt an intervention strategy when she uses it next time

- c. discuss toys that would better help the child learn
- d. ask the caregiver to bring the child into the clinic for more therapy

- 17. To find out what intervention might be most immediately relevant and useful to the caregiver, the service provider can ask:
  - a. "How have things been going since the last visit?
  - b. "What concerns do you have?"
  - c. "What are the biggest challenges during your day?"
  - d. "What makes your child smile?
- 18. Two strategies that help caregivers gain deep understanding of how to successfully use intervention with the child are:
  - a. problem-solving and reflection
  - b. learning in context and in real time
  - c. practice and feedback
  - d. accessing prior knowledge and joint planning
- 19. Collaborative problem-solving is a coaching strategy that is typically used:
  - a. before the caregiver practices using an intervention strategy
  - b. while the caregiver practices using an intervention strategy
  - c. after the caregiver practices using an intervention strategy
  - d. both a and c
- 20. Tori, Jacob's child care provider, uses the sign for cookie and says "cookie" to prompt Jacob to request a cookie at snack time. Jacob puts his hands together and looks at Tori. Derrick says "It looks like Jacob is imitating your sign. I think he wants another cookie." Derrick is using:
  - a. reflective conversation
  - b. caregiver practice with feedback
  - c. collaborative problem-solving
  - d. joint planning

## **APPENDIX B**

## **Social Validity Survey**

- 1. Which of the following best describes your knowledge of adult learning strategies <u>before</u> the training course?
  - a. Extensive
  - b. Moderate
  - c. Limited
  - d. None
- 2. Which of the following tools did you use during the training course? (Please select all that apply.)
  - a. Chat
  - b. Text tool (typing on the screen)
  - c. Pointer tool
  - d. None of the above
- 3. At six sessions, the length of the training course was:
  - a. Too long
  - b. Just right
  - c. Too short
  - d. Other (please specify)

- 4. Which of the following best describes your level of satisfaction with the training course?
  - a. Highly satisfied
  - b. Satisfied
  - c. Somewhat satisfied
  - d. Not at all satisfied

(Please explain)

- 5. Which of the following best describes your knowledge of adult learning strategies <u>after</u> the training course?
  - a. Extensive
  - b. Moderate

- c. Limited
- d. None
- 6. How will you use the information you learned?

- 7. Have you ever completed a web-based training course prior to this activity? a. No
  - b. Yes (please describe the training topic, format, and date completed)

8. Please rate your experience completing this training course compared to other experiences with web-based training. (If participant answers "no" to the preceding question, this question will be skipped.)

	Excellent	Good	Average	Fair	Poor
--	-----------	------	---------	------	------

(Please explain)

- 1	
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9. Please rate:

	Excellent	Good	Average	Fair	Poor
Overall					
rating of					
training					
course					
Organization					
of training					
course					
Usefulness					
of content					
presented					
Usefulness					

of resource			
links			
Instructor's			
knowledge			
of content			
Presentation			
style of			
material			
presented			
Value of			
group			
discussion			

# 10. Please indicate the extent you agree with each of the following statements.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	N/A
I liked the	2					
interactive						
webinar						
format for						
receiving						
information						
about adult						
learning in						
early						
intervention.						
I liked the						
embedded						
support						
sessions as a						
way of						
receiving						
feedback						
and support.						
This						
training						
course						
(including a						
series of						
interactive						
webinars						
and						
embedded						
support						
sessions)						

			1
was more			
effective			
than a single			
workshop.			
The			
information			
I learned			
was			
practical			
and useful			
to me in my			
work.			
I was able to			
use what I			
learned			
immediately			
in my work			
with			
families.			
I learned			
about			
strategies			
that I will			
continue to			
use in my			
work with			
families			
The format			
of this			
training			
course			
worked well			
for mo			
I feel more			
i leel more			
confident in			
Iny			
knowledge			
of adult			
learning in			
early			
intervention.			
As a result			
of this			
training			
course, my			
knowledge			

and skills			
related to			
supporting			
caregivers'			
learning			
during EI			
visits have			
increased.			
This			
training			
course will			
have a			
positive			
impact on			
my			
professional			
work.			

# 11. Please indicate if you encountered any technical difficulties related to:

	Yes	No
Logging in to Blackboard		
Collaborate to access the		
training sessions		
Calling in to the training		
sessions using the		
conference line		
Participating in the sessions		
using Blackboard tools (i.e.,		
chat, polls)		
Accessing the online		
resources (readings, video		
examples)		
Uploading the videos of		
your EI visits		

Indicate other technical problems/issues that were not listed above:

12. What else would you like to share with the individuals who developed this training course? Please be specific in your feedback.

## **APPENDIX C**

#### **Questions for Follow-Up Interview**

- 1. Tell me about your experience as a learner during the training course.
- 2. Please describe how you participated during the webinars.
- 3. Please describe how you participated during the embedded support sessions.
- 4. Tell me about your experience trying to apply what you learned in your work with families between training sessions.
- 5. Tell me about your experience with the self-assessments.
- 6. What did you learn from the experience of recording yourself on video before and after the training course?
- 7. Do you believe that you have used the skills you learned during the training course in your work with families? If so, in what ways specifically have you used what you learned? Please be as specific as possible.
- 8. Is there any other feedback about your experience with this training course that you would like to provide?
# **APPENDIX D**

### **Embedded Support Sessions #2 and #6**

# Initial and Final Self-Assessment: How Are You Supporting Caregiver Learning during EI Visits?

Instructions: Read each item and check the box that most closely resembles how often you implement the practice in your work with caregivers and children during early intervention visits.

	Never	Sometimes	Most of the	Always	I don't
			time		know
During the visit, I focus my					
attention on helping the					
caregiver learn how to					
support his/her child.					
I work closely with the					
caregiver to plan for					
intervention.					
I help the caregiver					
understand how and why to					
use intervention					
strategies/suggestions with					
the child.					
I provide more than one					
opportunity for the caregiver					
to apply what he/she is					
learning during the visit.					
I focus intervention on what					
is immediately relevant and					
useful to the family.					
The caregiver practices using					
intervention strategies with					
his/her child during the visit.					
I ask questions to explore					
what the caregiver already					
knows or has already tried					
before developing					
intervention strategies.					
I take the time to observe the					
parent and child interacting					
during natural activities.					
The caregiver and I discuss					
any successes and challenges					
with using intervention					

strategies with the child.			
I help the caregiver problem-			
solve how to use			
intervention strategies during			
the family's daily activities.			
I provide specific feedback			
to the caregiver about his/her			
use of intervention			
strategies.			
I develop a joint plan with			
the caregiver during each			
visit to plan for what he/she			
will do with the child			
between visits.			

Note your strengths and challenges related to implementing the adult learning principles and strategies, as well as your specific plan for improvement below. Be as specific as possible.

My strengths:

My challenges:

My plan for improvement:

### **APPENDIX E**

## **Embedded Support Session #4**

#### Self-Assessment:

# Using EI Adult Learning Strategies to Apply Adult Learning Principles during EI Visits

Adult Learning Principles:

#1: Adults learn best when what is being learned is immediately relevant and useful to them.

#2: Adults learn best when new knowledge is built on prior knowledge.

#3: Adults learn best through active participation and practice.

#4: Adults learn and remember most successfully when what they are learning is practiced in context and in real time.

#5: Adult learners want feedback on their learning and performance.

EI Adult Learning Strategies:

**Reflective Conversation** – Ask the caregiver an open-ended question to gain information about his/her prior knowledge about a target routine, activity, or problem and its relevance to everyday life. Examples: What have you already tried? What do you already know about...?

**Caregiver Practice with Feedback** – Arrange for the caregiver to practice using an intervention strategy with the child while you observe. You share feedback during or following the practice activity about the caregiver-child interaction or the child's response.

**Collaborative Problem-Solving** – You and the caregiver problem-solve together how the caregiver will use the intervention strategy successfully during a future attempt in the same activity or other activities.

**Joint Planning** – You and the caregiver discuss his/her specific plan for using an intervention strategy between visits (when you are not present).

Instructions: Read each item and check the box that most closely resembles how often you implement the strategy in your work with caregivers and children during early intervention visits.

	Never	Sometimes	Most of the	Always	I don't
			time		know
I ask questions to explore					
what the caregiver already					
knows or has already tried					
before developing					
intervention strategies.					
The caregiver practices using					

intervention strategies with			
his/her child during the visit.			
I provide specific feedback			
to the caregiver about his/her			
use of intervention			
strategies.			
The caregiver and I discuss			
any successes and challenges			
with using intervention			
strategies with the child.			
I help the caregiver problem-			
solve how to use			
intervention strategies during			
the family's daily activities.			
I develop a joint plan with			
the caregiver during each			
visit to plan for what he/she			
will do with the child			
between visits.			

Note your strengths and challenges related to implementing the adult learning principles and strategies, as well as your specific plan for improvement below. Be as specific as possible.

My strengths:

My challenges:

My plan for improvement:

### **APPENDIX F**

### Letter to Providers about Study

[insert date]

Dear Service Provider,

We are conducting a study involving an inservice training course for early intervention (EI) service providers about how to support caregivers during EI visits. This training course will be conducted online and by phone, will last six weeks, and will include one follow-up interview after the training course ends. After completing the requirements of this study, you will receive a certification of completion documenting 15 professional development hours and a \$50 Amazon gift card. Please carefully read the attached "Informed Consent Document" which describes the study and asks your permission for your participation. If you have any questions, please feel free to contact Dana Childress using the contact information below.

After reviewing the attached information, please return a signed copy of the "Informed Consent Document" form if you are willing to participate in the study. Keep a copy of the form for your records.

We thank you in advance for taking the time to consider your participation in this study.

Sincerely,

Dana Childress, M.Ed. Early Intervention Professional Development Consultant Partnership for People with Disabilities Virginia Commonwealth University

Doctoral Student Old Dominion University

dcchildress@vcu.edu 804-921-5369

#### **APPENDIX G**

#### **RESEARCH SUBJECT INFORMATION AND CONSENT FORM** Service Provider Participants

**TITLE:** Using a Multi-Component, Technology-Mediated Inservice Training Course to Enhance Early Intervention Service Providers' Abilities to Support Caregivers during Visits

#### VCU IRB NO.: HM20007768

#### **INVESTIGATOR:**

Dana Childress, M.Ed. Partnership for People with Disabilities Virginia Commonwealth University 804-921-5369

If any information contained in this consent form is not clear, please ask the study staff to explain any information that you do not fully understand. You may take home an unsigned copy of this consent form to think about or discuss with family or friends before making your decision.

#### PURPOSE OF THE STUDY

The purposes of this form are to give you information that may affect your decision whether to say YES or NO to participation in this research, and to record the consent of those who say YES. This project will involve completing a technology-mediated (online and by phone) inservice training course designed to enhance your knowledge and skills with supporting caregivers during intervention visits. The course will be conducted online and by teleconference and take six weeks to complete. Participants in this project will also complete required activities, including submitting two digital video recordings of early intervention visits with a family.

You are being asked to participate in this study because you are an early intervention service provider within the Infant & Toddler Connection of Virginia system.

#### DESCRIPTION OF THE STUDY AND YOUR INVOLVEMENT

If you decide to be in this research study, you will be asked to sign this consent form after you have had all your questions answered and understand what will happen to you.

This study is designed to learn about the effects of participation in a multi-component, technology-mediated inservice training course. Early intervention (EI) service providers will participate in a 6-week training about supporting caregivers during intervention visits.

If you decide to participate, your experience with the training course will be surveyed. If you say YES, then you agree to attend a weekly webinar or embedded support session for 1 ½ hours for six weeks. You will complete required activities between webinars and embedded support sessions and will submit two videos of intervention visits with a family (before and after the training). You will also participate in a follow-up interview after the training which is expected

to last 45 minutes. Your participation will require an internet connection, the use of a computer with access to Blackboard Collaborate, a telephone, and access to digital recording equipment with which to record two EI visits with a family. Approximately 10 EI service providers will be participating in this study.

Significant new findings developed during the course of the research which may relate to your willingness to continue participation will be provided to you.

# **RISKS AND DISCOMFORTS**

If you decide to participate in this study, you may face minimal risks. To minimize the risk of a breach of confidentiality, your identifying information will be stored using identification numbers (instead of your name) and all data collected in this study will be stored using encrypted files. Each training session will last 90 minutes. Some training participants may find this taxing but a break will be provided when requested.

# **BENEFITS TO YOU AND OTHERS**

By participating in this research, you may enhance your knowledge and skills related to supporting caregivers during intervention visits. The families with whom you work may also benefit from your enhanced knowledge and skills. You will receive individualized performance feedback during the training course and follow-up support during a phone call with the researcher/trainer after the training. You will also receive a certificate of completion at the conclusion of the course to document 15 hours of professional development, which can be used toward your state EI re-certification.

# COSTS

There are no costs for participating in this study other than the time you will spend in the weekly training sessions, completing brief readings, filling out the knowledge measures, survey, and self-assessments, and recording the two intervention visit videos.

# PAYMENT FOR PARTICIPATION

When you complete all training requirements, you will be offered a \$50 Amazon gift card which will be mailed to you with your certificate of completion.

# CONFIDENTIALITY

Potentially identifiable information about you will consist of two intervention visit video submissions, knowledge measures, surveys, self-assessments and interview notes and recordings. Data is being collected only for research purposes.

Your data will be identified by ID numbers, not names, and stored separately from research data in a locked research area. All personal identifying information will be kept in password protected, encrypted files and these files will be deleted at the end of the study. Access to all data will be limited to study personnel.

All written documentation will use a code number instead of your name as an identifier. Video submissions will be transferred between you and the researcher using the secure VCU Filelocker

system and stored on a secured VCU laptop as encrypted files. Videos will be destroyed following the study.

We will not tell anyone the answers you give us; however, information from the study and the consent form signed by you may be looked at or copied for research or legal purposes by Virginia Commonwealth University. Personal information about you might be shared with or copied by authorized officials of the Department of Health and Human Services or other federal regulatory bodies.

What we find from this study may be presented at meetings or published in papers, but your name will not ever be used in these presentations or papers.

# ALTERNATIVES

Your alternative to participating in this research is to not participate.

# VOLUNTARY PARTICIPATION AND WITHDRAWAL

Your participation in this study is voluntary. You may decide to not participate in this study. Your decision not to take part will involve no penalty or loss of benefits to which you are otherwise entitled. If you do participate, you may freely withdraw from the study at any time. Your decision to withdraw will involve no penalty or loss of benefits to which you are otherwise entitled.

Your participation in this study may be stopped at any time by the study staff without your consent. The reasons might include:

- the study staff thinks it necessary for your health or safety;
- you have not followed study instructions; or
- administrative reasons require your withdrawal.

# QUESTIONS

If you have any questions, complaints, or concerns about your participation in this research, contact:

# Dana Childress 804-921-5369 dcchildress@vcu.edu

The researcher/study staff named above is the best person to call for questions about your participation in this study.

If you have any general questions about your rights as a participant in this or any other research, you may contact:

Office of Research Virginia Commonwealth University 800 East Leigh Street, Suite 3000 P.O. Box 980568 Richmond, VA 23298 Telephone: (804) 827-2157

Contact this number to ask general questions, to obtain information or offer input, and to express concerns or complaints about research. You may also call this number if you cannot reach the research team or if you wish to talk with someone else. General information about participation in research studies can also be found at

http://www.research.vcu.edu/human\_research/volunteers.htm.

### CONSENT

I have been given the chance to read this consent form. I understand the information about this study. Questions that I wanted to ask about the study have been answered. My signature says that I am willing to participate in this study. I will receive a copy of the consent form once I have agreed to participate.

Participant Name (Printed)	Participant Signature	Date	
Name of Person Conducting Informed (Printed)	Consent Discussion		
Signature of Person Conducting Inform	ned Consent Discussion	Date	
Principal Investigator Signature (if dif	ferent from above)	Date	

### **APPENDIX H**

### Letter to Parent about Study

[insert date]

Dear Parent,

We are conducting research involving training for early intervention (EI) service providers about how to support families during EI visits. For this study, your service provider,

\_\_\_\_\_\_, will be participating in a 6-week online training. As part of his/her participation, your provider must digitally record two intervention visits. Your provider is requesting your permission to work with your family for the duration of this study and to digitally record two videos of visits with you and your child present.

One video will be recorded now (before the training course begins) and the other video will be recorded in about 6-7 weeks (after the training course ends). These videos will only be used for the purposes of this study and will be deleted after the research is finished.

I would like to schedule a phone call with you at your earliest convenience to discuss this research, answer any questions you may have, and request your verbal consent for your participation and your child's participation. If you are interested in participating, your service provider will provide me with your contact information and I will call you at a time that is convenient for you. If you decide to provide your verbal consent, you may change your mind and withdraw from the study at any time. You may also call or email me using the contact information below anytime.

We thank you in advance for taking the time to consider this request.

Sincerely,

Dana Childress, M.Ed. Early Intervention Professional Development Consultant Partnership for People with Disabilities Virginia Commonwealth University

Doctoral Student Old Dominion University

dcchildress@vcu.edu 804-921-5369

#### **APPENDIX I**

#### **RESEARCH SUBJECT INFORMATION AND CONSENT FORM** *Parent and Child Participants*

**TITLE:** Using a Multi-Component, Technology-Mediated Inservice Training Course to Enhance Early Intervention Service Providers' Abilities to Support Caregivers during Visits

#### VCU IRB NO.: HM20007768

#### **INVESTIGATOR:**

Dana Childress, M.Ed. Partnership for People with Disabilities Virginia Commonwealth University 804-921-5369

If any information contained in this consent form is not clear, please ask the study staff to explain any information that you do not fully understand. You may keep a copy of this consent form to think about or discuss with family or friends before making your decision.

#### PURPOSE OF THE STUDY

The purposes of this form are to give you information that may affect your decision whether to say YES or NO to participation in this research.

You are being asked to participate in this study because your early intervention service provider is participating in this research, and would like to videotape two (2) visits with you and your child as a part of his/her participation.

#### DESCRIPTION OF THE STUDY AND YOU AND YOUR CHILD'S INVOLVEMENT

If you decide to be in this research study, you will be asked to provide verbal consent after you have had all your questions answered and understand what will happen to you and your child.

We are conducting research involving training for early intervention (EI) service providers about how to support families during EI visits. Your service provider, \_\_\_\_\_\_\_, is participating in this online inservice training course for early interventionists entitled, *Using Adult Learning Strategies to Support Caregivers during Early Intervention Visits*. Participants in this training course are required to digitally record two early intervention videos of visits with a child and family. Your service provider would like to record two visits with you: one video now and another video in 6-7 weeks. These videos will be used to attempt to improve services for children and families enrolled in early intervention.

#### **RISKS AND DISCOMFORTS**

If you decide to participate in this study, you may face minimal risks. To minimize the risk of a breach of confidentiality, the videos will be stored using identification numbers (instead of your name or your child's name) and all data collected in this study will be stored using encrypted files. The videos will also be destroyed after the research is completed. If you or your child

become uncomfortable with being recorded during the intervention session, you may request that the recording be stopped at any time.

# **BENEFITS TO YOU AND OTHERS**

While you may not receive any direct benefits by participating in this research, your participation may help to improve the quality of the support offered by EI service providers, as well as the training available to them.

# COSTS

There are no costs for participating in this study

# PAYMENT FOR PARTICIPATION

You will not receive any payment for your participation in this study.

# CONFIDENTIALITY

Potentially identifiable information about you and your child will consist of two intervention visit video recordings. This data is being collected only for research purposes. The video recordings will be transferred between your service provider and the researcher using the secure VCU Filelocker system and stored on a secured VCU laptop as encrypted files. All video recordings will be destroyed at the completion of the study. While you and your child may be identified by name in the videos, we will take precautions to prevent the disclosure of your names to anyone outside of this research team. These precautions include using identification numbers instead of names to identify each video recording and limiting access to all data to study personnel only.

We will not share your personal information with anyone outside of study personnel; however, information from the study may be looked at or copied for research or legal purposes by Virginia Commonwealth University. Personal information about you might be shared with or copied by authorized officials of the Department of Health and Human Services or other federal regulatory bodies.

What we find from this study may be presented at meetings or published in papers, but your name and your child's name will not ever be used in these presentations or papers.

# ALTERNATIVES

Your alternative to participating in this research is to not participate.

# VOLUNTARY PARTICIPATION AND WITHDRAWAL

Your participation in this study is voluntary. You may decide to not participate in this study. Your decision not to take part will involve no penalty or loss of benefits to which you are otherwise entitled. If you do participate, you may freely withdraw from the study at any time. You may also withdraw the videos that are recorded with you and your child at any time. Your decision to withdraw will involve no penalty or loss of benefits to which you are otherwise entitled. Your participation in this study may be stopped at any time by the study staff without your consent. The reasons might include:

- the study staff thinks it necessary for your health or safety;
- you have not followed study instructions; or
- administrative reasons require your withdrawal.

By agreeing to participate in this study, you are granting permission to your service provider to digitally record two videos of intervention visits with you and your child and then share these recordings with the trainer/researcher in the training course he/she is taking. No use of video images will be made other than for the purposes of this study. The researchers are unable to provide any monetary compensation for use of these materials. You can withdraw your voluntary consent at any time.

# QUESTIONS

If you have any questions, complaints, or concerns about this research, contact:

Dana Childress 804-921-5369 dcchildress@vcu.edu

The researcher/study staff named above is the best person to call for questions about this study.

If you have any general questions about this or any other research, you may contact:

Office of Research Virginia Commonwealth University 800 East Leigh Street, Suite 3000 P.O. Box 980568 Richmond, VA 23298 Telephone: (804) 827-2157

Contact this number to ask general questions, to obtain information or offer input, and to express concerns or complaints about research. You may also call this number if you cannot reach the research team or if you wish to talk with someone else. General information about participation in research studies can also be found at

http://www.research.vcu.edu/human\_research/volunteers.htm.

#### **APPENDIX J**

#### **Training Course Requirements Handout**



7.20.16

#### APPENDIX K

#### **Video Requirements Handout**





Using Adult Learning Strategies to Support Caregivers during Early Intervention Visits

#### **VIDEO REQUIREMENTS**

Both of the videos required for this training course should show you supporting a caregiver and child during an intervention visit. Each video should be at least 45 minutes long to show your entire intervention visit.

#### Consent

It is recommended that you get permission from your supervisor/agency before videotaping during work hours or with families enrolled in an Infant & Toddler Connection program.

Be sure that the family has reviewed the Letter to Parents about the Study and the Consent form and provided Dana with verbal consent before recording your first video. If, at any time, the caregiver decides to withdraw consent, please stop the recording and let Dana know.

#### **Submitting Your Videos**

Since videos are large files and usually too big to send by email, we will use a secure file sharing service through Virginia Commonwealth University called VCU Filelocker. When your video is ready to submit, you'll need to email Dana to request the upload link. She will email you a link from Filelocker and provide easy instructions for uploading. Don't forget - your first video is due before the first day of the course (Sept 7th)!

#### Video Formats

Preferred format: .mp4

Here are a few suggestions for videotaping:

- ALWAYS capture video horizontally! This will make your video easier to see and use. If you are using an iPad or
  camera phone, be sure to hold or mount it horizontally.
- Use a video camera with a good mic and a tripod if possible. Cell phone cameras are okay but just check to be sure that your phone will pick up the voices and capture the images clearly as possible. iPad videos are huge files so if possible, try to use some other piece of equipment or be prepared to compress the video before sending if needed.
- Be sure you have good lighting, preferably with the light behind the camera.
- Be aware of background noise in the environment. If possible, turn fans, TVs, or other noises off so that the microphone on your camera will pick up your voices.
- Wait a few seconds after you turn on the camera before you begin your visit. Before stopping your video, wait a few seconds too. This buffer on either end will help with editing.
- Be sure to charge your camera and/or plug it in during filming to avoid your battery going dead during a fantastic visit!
- After filming, back-up your video file as soon as possible by saving it to your computer, external hard drive, cloud or some other safe place.

If you need more information about making your video, check out this great resource from Larry Edelman's presentation at the Inclusion Institute (2014), <u>Using Digital Video in Early Care and Education and Early Intervention</u> (click on link).

Feel free to email Dana Childress at dcchildress@vcu.edu if you need further information or support.

### **APPENDIX L**

#### **Reflection Questions: Session 5**

Using El Adult Learning Strategies to Support Caregiver Intervention **BETWEEN** Visits



**Reflection Questions** Session 5

1. How do you know when parents are comfortable with using intervention strategies between visits?

2. What is your experience with collaborative problem-solving about using intervention strategies *between* visits?

\_\_\_\_ Easy to do \_\_\_\_ Depends on the family \_\_\_\_ Hard \_\_\_\_ Not sure

What challenges have you faced with collaborative problem-solving about what happens or will happen *between* visits? What could you do differently to overcome these challenges?

3. What questions do you ask to facilitate collaborative problem-solving about *future* uses of a strategy?

4. What should Joyce do or say next to help Anita be prepared when she and Charlie go to the pool without her? Which EI adult learning strategies should she use? Why?

5. How does joint planning work on your visits? How do you ensure that the parent will remember what she's agreed to do?

# **APPENDIX M**

# Video Coding Data Sheet

**RC** - **Reflective Conversation** – Service provider asks caregiver an open-ended question to gain information about his/her prior knowledge about or experience with a target routine, activity, or problem and its relevance to everyday life. Examples: *What have you already tried? What do you already know about...?* 

Minimum of one verbal exchange between caregiver and provider. When the RC begins during one interval and ends during the next interval, RC is coded for the second interval. A new RC is coded when a new routine, activity, or problem is discussed.

Example: Provider: "What have you already tried to help Ella learn to feed herself?" Caregiver: "I've tried different spoons but she still spills most of her food before it gets to her mouth."

Non-examples:

- Caregiver mentions routine or activity and service provider immediately gives suggestions.
- No open-ended questions are used by service provider.
- Service provider initiates reflective conversation but the parent does not answer.

**CPF** - **Caregiver Practice with Feedback** – Caregiver practices using an intervention strategy by engaging the child while the service provider observes. Service provider shares at least one specific instructional or affirmative verbal feedback statement during or following the practice episode about the caregiver-child interaction or the child's response.

Minimum of one parent-child practice opportunity and one verbal feedback statement from service provider. When the CPF begins during one interval and ends during the next interval, CPF is coded for the second interval. A new CPF is coded when a new episode of caregiver practice begins following the previous feedback statement (e.g., caregiver helps Ella scoop her food, receives feedback from provider [first CPF], then uses the intervention strategy to help Ella take another bite, following by another feedback statement [second CPF]).

Example: Caregiver takes her daughter's hand to help her scoop food on a spoon and bring the spoon to her daughter's mouth for self-feeding. Service provider praises the mother's efforts by saying "I like how you helped her scoop her mashed potatoes. She hardly spilled any food this time."

Non-examples:

- Service provider interacts/models with child while caregiver observes.
- Caregiver and service provider talk about using an intervention strategy without practicing it.
- Caregiver practices using targeted intervention strategy but service provider does not provide any feedback.
- Service provider provides general feedback like "good job" or "nice" without specifically commenting on the caregiver-child interaction or the child's response.

**CPS - Collaborative Problem-Solving** – The service provider or caregiver shares a challenge or wonders about how to use an intervention strategy differently. Then, they problem-solve together how the caregiver will use an intervention strategy differently or more successfully during the next attempt or a future attempt to address the challenge. CPS may focus on immediate use of the strategy and/or use of the strategy during other routines or activities. CPS includes a minimum of one verbal exchange between the caregiver and service provider to problem-solve how the caregiver will use an intervention strategy differently or more successfully during the next or a future attempt. CPS can be initiated by either person.

When the CPS begins during one interval and ends during the next interval, CPS is coded for the second interval.

Examples:

Caregiver: "She seems to resist me when I try to help her get the spoon to her mouth. I think she wants to do it herself." Provider: "What could you do to make Ella feel more like she is feeding herself?"

OR

Provider: "I noticed that Ella is pushing your hand away. What could you do to help her get comfortable with you holding her hand? Caregiver: "I guess I could sit behind her next time so that she sees herself doing the work."

Non-examples:

- Service provider tells the caregiver what to do to "solve" a problem without asking for the caregiver's ideas first.
- Caregiver mentions a problem but it is not addressed by the service provider.
- Service provider initiates CPS but the parent does not reply.

**JP** - **Joint Planning** – Service provider and caregiver discuss a specific plan for how the caregiver will use an intervention strategy between visits (e.g., "How will you use the strategy you learned today during the week?").

JP includes a minimum of one verbal exchange between the caregiver and service provider regarding a plan for using an intervention strategy during the week when the service provider will not be present.

#### Example:

Provider: "How will you help Ella feed herself after our visit today?"

Caregiver: "I feed her every meal so I can remember to sit behind her each time. We will start by practicing tonight at dinner."

Non-examples:

- Service provider prescribes activities for the caregiver to do between visits without asking for the caregiver's input.
- Visit ends with no discussion of what the caregiver will do with the child between visits.

	Video Coding Data Sheet			
Video #:	Video Length: minutes			
Coder:	Interrater Reliability:			
	-			

<b>30-sec Interval</b>	RC	CPF	CPS	JP	COMMENTS
1					
2					
3					
4					
5					
6					
7					
8					
9					
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11					
12					
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31			
32			
TOTALS			

Video Time Stamp (minute:seconds) - ENDING TIME:

# 2 MINUTE BREAK

Video Time Stamp (minute:seconds) - STARTING TIME:

<b>30-sec Interval</b>	RC	CPF	CPS	JP	COMMENTS
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
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64			
TOTALS			

	RC	CPF	CPS	JP
<b>TOTALS for Entire</b>				
Video				

# **APPENDIX** N

# Procedural Fidelity Checklist - Interactive Webinar Session

Session #: Date:					
PROCEDURE	P	NP	COMMENTS		
Login and call-in details are emailed to participants before the first session					
Blackboard Collaborate training site is open at least 10 minutes before the start of each session					
Conference call line is open at least 5 minutes before each session					
Session begins on time					
Participants are welcomed to session by name					
Agenda for each session is reviewed at the beginning of the session					
Content is presented visually using PowerPoint slides					
At least one example is provided during presentation that applies the content to EI practices (i.e., case scenario, vignette)					
At least three opportunities are available for participants to interact using web-based or live chat					
At least two whiteboard tools are used for interaction during the session (i.e., polling, matching, textbox)					
Assignments are summarized					
Session ends on time					

KEY:  $\mathbf{P} = \text{present}$  $\mathbf{NP} = \text{not present}$ 

# **APPENDIX O**

# Procedural Fidelity Checklist - Embedded Support Session

Session #: Date:			
PROCEDURE	Р	NP	COMMENTS
Login and call-in details are emailed to participants before the first session			
Blackboard Collaborate training site is open at least 10 minutes before the start of each session			
Conference call line is open at least 5 minutes before each session			
Session begins on time			
Participants are welcomed to session by name			
Support is visually guided by a brief PowerPoint presentation			
Each participant shares an update from his/her self- assessment or plan			
Each participant receives performance feedback based on his/her self-assessment or plan			
Participants are invited to share strengths related to applying what was learned in the last session during the previous week in their work with families			
Participants are invited to share challenges related to applying what was learned in the last session during the previous week in their work with families			
At least three opportunities are available for participants to interact using web-based or live chat			
Each participant shares a brief plan for improving his/her skills in the coming week			
Assignments are summarized			
Session ends on time			

# KEY: $\mathbf{P} = \text{present}$ $\mathbf{NP} = \text{not present}$

#### VITA

# Dana C. Childress Darden College of Education Old Dominion University 4301 Hampton Blvd Norfolk, 23529 <u>dchil010@odu.edu</u>

Education		
2017	Ph.D.	Old Dominion University, Norfolk, VA;
		Special Education with emphasis on Early
		Intervention (0-3)
1998	M.Ed.	James Madison University, Harrisonburg,
		VA; Early Childhood Special Education with
		emphasis on Early Intervention
		(0-3)
1995	B.S.	James Madison University, Harrisonburg,
		VA; Psychology
Experience		
May 2010-Present		Early Intervention Professional Development Consultant, Faculty,
5		Partnership for People with Disabilities, Virginia Commonwealth

5	Partnership for People with Disabilities, Virginia Commonwealth
	University, Richmond, VA
Sept 2010-Feb 2016	Student Lecturer (1 semester course and 7 class sessions), Old
	Dominion University, Norfolk, VA.
Sept 2009-Apr 2010	Assistant to Major Professor, Old Dominion University,
	Norfolk, VA.

#### **Publications**

Textbook

Raver, S. A., & Childress, D. C. (2015). *Family-centered early intervention: Supporting infants and toddlers in natural environments*. Baltimore, MD: Paul H. Brookes.

#### **Peer Reviewed Publications**

Childress, D. C., Raver, S. A., Michalek, A. M., & Wilson, C. L. (2013). Enhancing service coordination knowledge through professional development. *Infants & Young Children*, 26(2), 164-176.

Childress, D. C. (2010). Play behaviors of parents and their young children with disabilities. *Topics in Early Childhood Special Education*, *31*(2), 112-120.

Childress, D. C. (2004). Special instruction and natural environments: Best practices in early intervention. *Infants & Young Children*, 17(2), 162-170.