THE EFFECTS OF COACHING ON TEACHERS’ USE
OF EMBEDDED NATURALISTIC
COMMUNICATION PROMOTING STRATEGIES

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THE EFFECTS OF COACHING ON TEACHERS’ USE OF EMBEDDED NATURALISTIC COMMUNICATION PROMOTING STRATEGIES (132 pp.)

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The purpose of the study was to examine the impact of a coaching package on teachers’ of implementation of embedded naturalistic communication promoting strategies, specifically milieu teaching. A multiple-baseline across participants design was used to determine effect of the coaching on implementation of the strategies. The findings suggest that the professional development workshop alone was not effective in ensuring implementation. However, visual analysis and effect size calculation support the existence of a functional relationship between the coaching package and the implementation of the milieu teaching strategies with fidelity. The findings of the study add to the literature base supporting the need for coaching to support implementation of effective practices.
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I am thankful to my husband for his continued encouragement, my mother for her unyielding belief in my abilities, and my brother for keeping me constantly aware of why I care so much about this field. Additionally, I am appreciative to Teresa Brown for her help with the data, to Sandra Hess Robbins for being responsive to my calls for help, and to Jennifer Champagne for the continued reassurance and reminders to stay focused and finish this work. Finally, I would like to acknowledge the teachers who took the time and energy to participate in this project. Their commitment to their work inspires me.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ACKNOWLEDGMENTS</td>
<td>iv</td>
</tr>
<tr>
<td></td>
<td>LIST OF FIGURES</td>
<td>vii</td>
</tr>
<tr>
<td></td>
<td>LIST OF TABLES</td>
<td>viii</td>
</tr>
<tr>
<td></td>
<td><strong>CHAPTER</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I. LITERATURE SYNTHESIS</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Embedded Learning Opportunity: A Research-based Practice</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Milieu Teaching Strategies</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>How to Support Implementation of Research-based Practices</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Defining Coaching in ECSE</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Training Teachers to Use ELOs</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>A Coaching Package to Support the Embedding of Naturalistic Strategies</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>II. METHOD</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Participants</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Teacher / Child Dyads</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Setting</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Instruments and Measures</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Embedded Recording Measure</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>Coaching Fidelity Measure</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Teacher Perception Survey</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Professional Development</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Initial Workshop</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Ongoing Coaching Protocol</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>Technology</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>Design</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>Threats to Validity</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>Workshop Baseline</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>Coaching Intervention</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>Interobserver agreement</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Summary</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>III. RESULTS</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>Coaching Fidelity</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>Visual Analysis</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>Baseline to Intervention</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>Effect Size</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>Social Validity</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td>Summary</td>
<td>53</td>
</tr>
</tbody>
</table>
### IV. DISCUSSION

- Convergence and Divergence ................................................................. 54
- Effectiveness of Coaching ........................................................................ 55
- Limited Effectiveness of Workshops ....................................................... 57
- Focus on Quality Implementation .......................................................... 58
- Focus on Operationally Defined and Quality Coaching ........................ 59

### Explanations of Findings .................................................................... 60
- Teacher 1 .................................................................................................. 61
- Teacher 2 .................................................................................................. 63
- Teacher 3 .................................................................................................. 64

### Threats to Validity .............................................................................. 66
- Internal threats .......................................................................................... 67
- External threats .......................................................................................... 69

### Limitations ........................................................................................... 70
- Variable Performance ............................................................................... 70
- Timing of the Study ................................................................................... 71
- Use of Technology ...................................................................................... 71
- Teacher Generalization ............................................................................ 72

### Implications .......................................................................................... 73
- Coaching as Part of Professional Development ....................................... 73
- The Use of Technology to Deliver Coaching ......................................... 74
- Acceptability of Coaching ....................................................................... 75

### Future Directions ................................................................................ 76
- Provision of Coaching to Large Numbers of Teachers .......................... 76
- Identifying and Training Potential Coaches ............................................ 77
- Continued Focus on Describing Coaching Models ............................... 78

### Conclusion ............................................................................................ 78

### APPENDICES ......................................................................................... 79
- APPENDIX A. TEACHER CONSENT FORMS. ........................................ 80
- APPENDIX B. PARENTAL CONSENT FORMS ......................................... 84
- APPENDIX C. EMBEDDED RECORDING MEASURE .............................. 88
- APPENDIX D. COACHING FIDELITY MEASURE .................................. 90
- APPENDIX E. TEACHER PERCEPTION SURVEY .................................. 92
- APPENDIX F. POWERPOINT HANDOUT ............................................... 95
- APPENDIX G. CONCEPT MAP ............................................................... 101
- APPENDIX H. CRITICAL COMPONENT CHECKLIST ............................ 103
- APPENDIX I. INSTRUCTIONAL PLAN ................................................... 105
- APPENDIX J: CODING MANUAL ............................................................ 107

### REFERENCES .......................................................................................... 111
LIST OF FIGURES

Figure

1. Components of correctly implemented milieu strategies.......................... 7
2. Example of correctly implemented model strategy .................................... 8
3. Correctly implemented milieu teaching strategies....................................... 31
4. Frequency of correctly implemented strategies ........................................... 45
LIST OF TABLES

Table

1. Environmental and Responsive Strategies ................................................................. 8
2. Procedural Steps for Milieu Teaching Strategies ...................................................... 9
3. Prominent Features of Coaching and Relevant Support ........................................... 14
4. Teacher Information ...................................................................................................... 27
5. Child Information ......................................................................................................... 27
6. Antecedents Related to Environmental and Responsive Strategies ......................... 29
7. Antecedents Related to Milieu Strategies .................................................................... 30
8. Description of Coaching Features ................................................................................ 32
9. Strategies Addressed in the Workshop ........................................................................ 34
10. Summary of Data ......................................................................................................... 53
CHAPTER I

LITERATURE SYNTHESIS

While research in the field of Early Childhood Special Education (ECSE) has identified instructional strategies known to positively impact outcomes for children with disabilities, a gap exists between what is identified as effective in the research and what actually occurs in real-world intervention settings (e.g., Campbell & Halbert, 2002; Greenwood, 2001; Odom et al., 2005; Odom & Wolery, 2003). ECSE professional development is intended to address the gap; however, teachers continue to struggle in using research-based strategies as designed or intended (Odom, 2009; Snyder, Hemmeter, & McLaughlin, 2011). Of particular concern are strategies that teachers can use to enhance children’s communication skill development. Acquisition and use of communication skills are predictors of positive outcomes, such as academic success, social relationships, and future employment, for children with disabilities (e.g. Carter, Austin, & Trainor, 2012; Guralnick, Connor, Hammond, Gorrman, & Kinnish, 1996; National Research Council, 2001). Specific practices shown to promote acquisition and use of communication skills when embedded into everyday routines and activities of young children are naturalistic and milieu teaching strategies (Christensen-Sandfort & Whinnery, 2011; Halle, Baer, & Spradlin, 1981; Hancock & Kaiser, 2006; Harjusola-Webb, & Robbins, 2012).

In the current study, early childhood special education teachers participated in professional development focused on embedding naturalistic and milieu teaching strategies into typical activities with children in their classrooms. The professional
development included a workshop training to teach the concepts, and coaching to promote fidelity of implementation. In this chapter, I examine how to support teachers in implementing milieu teaching strategies by exploring (a) the primary principles of the strategies (b) the factors that lead to implementation of research-based practices with fidelity and (c) the salient features of successful coaching models, (d) factors that support the embedding of instructional strategies into daily activities.

Embedded Learning Opportunity: A Research-based Practice

The practice of embedding instructional strategies into everyday activities is recommended by the Division for Early Childhood of the Council for Exceptional Children (DEC, 2014) and has been shown to support skill development across several domains for preschoolers with disabilities (e.g. Grisham-Brown, Schuster, Hemmeter, & Collins, 2000; Horn, Lieber, Li, Sandall, & Schwartz, 2000). The practice of embedding instructional procedures into a typical activity is commonly referred to as an Embedded Learning Opportunity (ELO). ELOs are used to provide instruction during naturally occurring activities that happen throughout the daily routine (Horn et al., 2000; Kaderavek, 2009). Embedding involves addressing target behaviors "in a manner that expands, modifies, or is integral to the activity or event in a meaningful way" (Pretti-Frontczak & Bricker, 2004, p. 40). An ELO includes both a clearly defined target behavior and the process to address the target behavior (i.e. instructional strategy).

Research shows that ELOs are effective interventions for children with various types and severity of disability (e.g. Daugherty, Grisham-Brown, & Hemmeter, 2001; Grisham-Brown et al., 2000; Horn et al., 2000; Kurt & Tekin-Iftar, 2008; Macy &
Bricker, 2007; McBride & Schwartz, 2003; Tate, Thompson, & McKerchar, 2005; VanDerHeyden, Snyder, Smith, Sevin, & Longwell, 2005; Venn & Wolery, 1992; Woods, Kashinath & Goldstein, 2004). The use of ELOs aligns with the key tenets of ECSE, specifically, that children learn by interacting with their environment and others in their environment, and that adults facilitate learning with intentional instruction (Odom & Wolery, 2003). ELOs allow for specialized instruction to occur within the context of naturally occurring activities, rather than requiring the instruction to occur out of context, which supports the provision of services in inclusive environments (Horn et al., 2000; Kaderavek, 2009), and improves generalization of the skill or target behavior (Horn et al., 2000; Losardo & Bricker, 1994; Venn & Wolery, 1992). Since they occur in natural activities and settings, ELOs meet the Individuals with Disabilities Education Act (IDEA) requirement to provide specialized instruction aimed to improve access, participation, and progress in typical, age-appropriate activities for preschool-aged children (IDEA, 2004). ELOs provide for multiple chances to practice target skills and behaviors, leading to increased fluency and maintenance of skills (Daugherty et al., 2001; Horn et al., 2000; Macy & Bricker, 2007). Finally, ELOs are aligned with developmentally appropriate practices due to the focus on children’s interests, strengths, and needs, in a contextually relevant and culturally responsive manner (Horn & Banerjee, 2009; Dinnebeil, Pretti-Frontczak, & McInerney, 2009).

Embedded learning opportunities can be used to improve young children’s social skills (Macy & Bricker, 2007), fine motor skills (Grisham-Brown, Pretti-Frontczak, Hawkins, & Winchell, 2009). Grisham-Brown et al., 2000; Horn et al., 2000), cognitive
skills (Daugherty et al., 2001; Grisham-Brown et al., 2000; Horn et al., 2000),
communication skills (Grisham-Brown et al., 2000; Losardo & Bricker, 1994; Mudd &
Wolery, 1987; Woods et al., 2004), leisure skills (Kurt & Tekin-Iftar, 2008) and
engagement in activities (Horn et al., 2000; McBride & Schwartz, 2003; VanDerHeyden
et al., 2005). ELOs are effective in addressing IEP goals (Daugherty et al., 2001; Horn et
al., 2000), as well as state early learning standards (Grisham-Brown et al., 2009).
Research supports the use of specific instructional strategies, such as time delay (Kurt &
Tekin-Iftar, 2008; Daugherty et al., 2001), antecedent-response-consequence learning
trials (Losardo & Bricker, 1994; McBride & Schwartz, 2003; VanDerHeyden et al.,
2005), and prompting procedures (Daugherty et al., 2001; Grisham-Brown et al., 2000),
within the context of the ELO.

While ELOs have been used with a variety of strategies addressing a variety of
skills, of particular interest are the strategies used to support children’s development of
communication skills. Deficits in communication skills are associated with a variety of
disabilities including autism, intellectual disabilities, specific language impairments, and
emotional disturbances (Pinborough-Zimmerman et al., 2007). Impairments in
communication skills are linked to social isolation, use of challenging behaviors, lack of
academic achievement, and limited employment opportunities (Carter et al., 2012;
Emerson et al., 2001; Guralnick et al., 1996; National Research Council, 2001). Given
the importance of communication skills, it is necessary to understand specific research-
based strategies to use within the context of the ELO, as well as how to best support
teachers in the implementation of such strategies.
**Milieu Teaching Strategies**

The following communication promoting strategies, known as milieu teaching, are recommended for use in ECSE: model, mand-model, time delay and incidental teaching (Wolery, 2005). Milieu teaching involves an adult purposefully and intentionally manipulating the child’s environment (i.e. milieu) to promote the development and use of language skills (Hart & Rogers-Warren, 1978). Milieu teaching strategies are inherently embedded learning opportunities, due to the fact that they are intended to be used as a part of a child’s typical and daily routine. These strategies, in combination with environmental arrangement and responsive intervention techniques, are known as Enhanced Milieu Teaching (Hemmeter & Kaiser, 1994; Hancock & Kaiser, 2006; Hancock & Kaiser, 2002; Kaiser, Hancock, & Nietfeld, 2000). Enhanced Milieu Teaching as has yielded positive outcomes for children considered at-risk for developmental delay (Dinehart, Kaiser, & Hughes, 2008; Hart & Risley, 1975), as well as those with identified disabilities including intellectual impairments (Kaiser & Roberts, 2013), specific language impairments (Alpert & Kaiser, 1992; Hancock & Kaiser, 1996; Kaczmarek, Hepting, & Dzubak, 1996; Yoder, Molfese, & Gardnera, 2011), and autism (Christensen-Sandfort & Whinnery, 2011; Hancock & Kaiser, 2002; Kaiser et al., 2000; Mancil, Conroy, & Haydon, 2009; Olive et al., 2007; Yoder & Stone, 2006).

Enhanced milieu teaching involves the adult utilizing the following environmental and responsive strategies: arranging the environment to promote communicative behavior, engaging the child by establishing joint attention, and following the child’s lead to promote a learning opportunity (Hancock & Kaiser, 2006; Hancock & Kaiser, 2002).
Then, the adult elicits the child’s target behavior using one of the following milieu teaching strategies: model, mand-model, time delay, or incidental teaching.

The milieu teaching strategies are based on incidental teaching, which involves prompting a child for a more elaborate or advanced behavior based on his or her self-initiated behavior (Hart & Risley, 1975). The model, mand-model, and time delay procedures are used as prompting procedures used in incidental teaching; however, the procedures may also be used outside of the context of incidental teaching. For example, the model procedure and the mand-model procedure (Warren, McQuarter, & Rogers-Warren, 1984; Rogers-Warren & Warren, 1980) can be used without requiring the child’s initiation. The model approach involves providing a verbal model for the child to imitate. The mand-model approach involves the question or instruction prompt and the imitative model prompt of the incidental teaching procedure. The time delay procedure also employs part of the incidental teaching procedure, allowing for less dependence on verbal cueing and more promotion of spontaneous behavior (Halle et al., 1981). Time delay involves establishing eye contact, using visual cue (such as showing the child a desired object), assuming a questioning look, and waiting a set number of seconds in order to encourage the child to initiate the target behavior (Halle et al, 1981).

While research shows that milieu teaching strategies have positive effect on the communication skills of children with a variety of disabilities (e.g. Dinehart et al., 2008; Kaiser & Roberts, 2013; Hancock & Kaiser, 1996; Yoder & Stone, 2006), the strategies must be implemented with procedural fidelity in order for them to be effective (Hancock
& Kaiser, 2006). Figure 1 represents the components of correctly implemented milieu teaching strategies.

**Figure 1. Components of correctly implemented milieu strategies.**

In addition to the use of environmental and responsive strategies, correctly implemented milieu teaching strategies utilize a three item contingency of (1) an antecedent for the teaching episode, (2) child communicative behavior/response, and (3) a contingent adult response (Hemmeter & Kaiser, 1994; Hancock & Kaiser, 2002; Kaiser et al., 2000). A response includes an expansion of the child's verbalization, as well as access to the requested item if the child exhibits the target behavior. If the child does not exhibit the target behavior, the correct response includes an additional prompt, with eventual access to the desired item (if appropriate). If a child does not demonstrate the target behavior, the adult provides another opportunity; however, the exchange always ends in a reinforcing way for the child (Delaney et al., 1997). Figure 2 displays an example of a correctly implemented milieu teaching strategy (specifically, model). Table 1 provides definitions of the environmental and responsive strategies. Table 2 provides procedural steps for the model, mand-model, time delay, and incidental teaching.
strategies and information concerning appropriate use.

**Figure 2.** Example of correctly implemented model strategy.

Table 1

*Environmental and Responsive Strategies*

<table>
<thead>
<tr>
<th>Type</th>
<th>Strategy</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Environmental</td>
<td>Access</td>
<td>Adult limits access to desired material or activity to elicit a communicative response from the child (Ostrosky &amp; Kaiser, 1991).</td>
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<tr>
<td>arrangement</td>
<td></td>
<td><strong>Unexpected event</strong> Adult performs an action that is different than what the child expects in order to elicit a communicative response from the child (Ostrosky &amp; Kaiser, 1991).</td>
</tr>
<tr>
<td>Insufficient materials</td>
<td></td>
<td>Child is not given enough or correct materials needed (Ostrosky &amp; Kaiser, 1991).</td>
</tr>
<tr>
<td>Engaging strategies</td>
<td>Nonverbal imitation</td>
<td>Adult performs the same motor actions on matching or comparable objects as the child (Delaney, Ezell, Solomon, Hancock, &amp; Kaiser, 1997).</td>
</tr>
<tr>
<td></td>
<td>Verbal mirror</td>
<td>Adult engages in nonverbal imitation and describes the movements (Delaney et al., 1997).</td>
</tr>
<tr>
<td></td>
<td>Follow child’s lead</td>
<td>Adult becomes involved in what the child is doing, relating his or her behavior to an object or activity of the child’s focus (Hancock &amp; Kaiser, 2002).</td>
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### Table 2

**Procedural Steps for Milieu Strategies**

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Steps</th>
<th>When to use</th>
</tr>
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| Model        | 1. Adult says a word, phrase, or sentence based on the focus of child’s attention with the intention that the child will imitate what is said  
2. (+) If the child imitates the model, the adult acknowledges what the child said (provides access if appropriate) and expands the utterance  
   (-) If the child does not imitate the model, the adult presents a second model prompt (corrective feedback)  
3. (+) If the child imitates the model, see 2(a).  
   (-) If the child does not imitate the model, the adult provides corrective feedback and access | Intended for use when a child is in the acquisition phase of learning basic vocabulary or requesting behaviors, or in generalization phase of imitation (e.g., child is not able to generate the words on his or her own) |
| Mand-model   | 1. Adult asks a question or makes a statement that requires a verbal response from the child (a wh-question, a choice).  
2. (+) If the child responds with target behavior, the adult acknowledges what the child said (provides access if appropriate) and expands the utterance.  
   (-) If the child does not respond with target behavior, the adult presents a model prompt (corrective feedback).  
3. (+) If the child imitates the model, see 2(a).  
   (-) If the child does not imitate the model, the adult provides corrective feedback and access | Intended for use when a child is in the fluency / generalization phase of learning words or requesting behaviors and / or in the acquisition phase of responding to questions |
| Time delay   | 1. Adult pauses in familiar routine or activity with an expectant look (wait for 5 seconds) with the intention that the child will verbalize.  
2. (+) If the child responds with target behavior, the adult acknowledges what the child said (provides access if appropriate) and expands the utterance.  
   (-) If the child does not respond with target behavior, the adult presents a mand or a model prompt (corrective feedback).  
3. (+) If the child responds with target behavior, see 2(a).  
   (-) If the child does not imitate the model, the adult provides corrective feedback and access | Intended for use when child is learning to initiate communicative behaviors |
| Incidental teaching | 1. When a child initiates a communicative exchange, the adult utilizes the model, mand-model, or time delay procedure to illicit a more advanced behavior  
2. Follow the procedural steps above. | Intended to be used to elicit more elaborate behaviors based on a child’s self-initiated behavior |

Note: Table adapted from McCormick, 2014
**How to Support Implementation of Research-based Practices**

Given the identified gap between research and practice, it is necessary to understand the characteristic of implementation to ensure children benefit from the practices existing in the literature (Fixen, Naom, Blasé, Friedman, & Wallace, 2005; Odom, 2009). The study of implementation science addresses how to translate research-based practices into varied real-life contexts (Downer & Yazejian, 2013). According to Fixen et al. (2005), “the essence of implementation is behavior change” (p. 43). When examining how to support implementation, one must consider not only the intervention, but also the efforts used to ensure the intervention is implemented as intended (Fixen et al., 2005). The research-based practice (i.e. the intervention) is comprised of core components. Core components are the specific factors of a given research-based practice or program that are necessary to produce benefit to the consumer (Fixen et al., 2005). The core components become the basis for support or effort to ensure implementation.

Professional development in the field of ECSE is used to support implementation of effective practices to improve outcomes for young children with disabilities (Odom, 2009; Snyder et al., 2011). In essence, professional development is provided to support the practitioner in integrating the core components of the strategy or program into their practice without sacrificing fidelity (Fixen et al., 2005). Fidelity encompasses two dimensions, fidelity to structure (e.g. dosage of the intervention) and fidelity to process (e.g. following the procedural steps of the intervention) (Downer & Yazejian, 2013; Odom et al., 2010). In other words, fidelity encompasses aspects of quantity and quality.
It is necessary to examine both aspects when describing core components (Dunst, Trivette, & Raab, 2013; Sutherland, McLeod, Conroy, & Cox, 2013).

Professional organizations recommend professional development be contextually relevant, include ongoing opportunities to apply knowledge to practice, and contain mechanisms to receive follow-up support (NAEYC, 1993; Miller & Stayton, 2005). Researchers in the field of ECSE recommend professional development efforts move away from one-time workshops (Odom, 2009; Snyder et al., 2011); yet, the predominant types of professional development offered to practitioners in ECSE continue to be workshops or training events (Bruder, Mogro-Wilson, Stayton, & Dietrich, 2009). The concern about the use of workshops or training events as the sole method of professional development is grounded in the literature. Several researchers have found that workshops led to minimal or inadequate execution of desired practices, but the addition of on-going support led to adherence of the practices (e.g., Brown & Woods, 2011; Casey & McWilliam, 2008; Tate et al., 2005). Neuman and Cunningham (2009) found that even intensive coursework provided over a semester did not impact teachers’ practices without additional support for implementation.

While well-designed workshops and training events can be efficient ways to build a knowledge base, increasing participants’ knowledge base does not necessarily lead to changes in practice. In fact, Joyce and Showers (2002) found the combination of theory, demonstration, and practice increased teachers’ knowledge by an effect size of 1.31; however, the effect size of transfer of knowledge into the classroom was 0. When the researchers added coaching support to the professional development, effect size of the
transfer into practice increased to 1.41. In a meta-analysis of effective adult learning strategies, Dunst and Trivette (2009) found an average effect size at a 95% confidence interval of .68 for coaching. In essence, if implementation is the desired outcome of the professional development model, coaching is an important component (Powell & Diamond, 2013).

**Defining Coaching in ECSE**

While evidence suggests that the practice of coaching supports implementation of research-based practices, much work needs to be done to understand what constitutes effective coaching. Specifically, there is a need to clearly articulate and study coaching models (Snyder et al., 2011), develop standardized coaching practices (Smith et al., 2010), and better define coaching roles and responsibilities (Whitebook, Gomby, Bellm, Sakai, & Kipnis, 2009).

The lack of consistent terminology is a challenge to the provision of highly effective coaching (Maxwell, Field, & Clifford, 2006). In 2011, NAEYC and the National Association of Child Care Resource and Referral Agencies (NACCRRA) created a glossary of terms to provide clarity to the field. According to NAEYC and NACCRRA, coaching is “a relationship-based process led by an expert with specialized and adult learning knowledge and skills… designed to build capacity for specific professional dispositions, skills, and behaviors and is focused on goal-setting and achievement for an individual or group” (p. 11). The process of coaching includes all of the following components: "questioning, listening, observation, reflection, feedback, prompting, modeling and practice" (p. 11).
An additional challenge to understanding coaching is the lack of standardized coaching practices being used in the field (Smith, Schneider, & Kreader, 2010) or being studied in the literature (Isner et al., 2007). Some evidence does suggest that specific features of coaching models align with the purpose: for purposes of fidelity of implementation, activities such as observation, modeling, and demonstration are common (Isner et al., 2007; Zaslow, Tout, Halle, Whittaker, Lavelle, 2010). One coaching model proposed for use in ECSE is by Hanft, Rush, and Shelden (2004). According to the authors, the process of coaching is "collaborative, performance-based, context-driven, reflective, reciprocal" (p. 4-5). In the proposed model, the coach and the learner observe each other. Coaches model practices and engage the learner in discussions, reflection and problem-solving. Other key features of the model include feedback and information sharing.

**Salient features.** Since the field of ECSE is a subset of the larger field of Early Childhood Education (ECE), an examination of coaching in ECE is warranted. In order to better define key features of effective coaching in ECE and ECSE, twenty empirical studies were examined. The included studies had measurable participant outcomes, examined the use of coaching in the context of implementation of teaching practices, were published in 2000 or later, and focused on adults working with or caring for infants, toddlers, and / or young children (including Kindergarteners). Examination of the coaching intervention descriptions reveals similar features across the studies. Table 3 highlights the features as well as provides operational definitions for each.
### Table 3

**Prominent Features of Coaching and Relevant Support**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Definition</th>
<th>Literature Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance feedback</td>
<td>Information given to the learner about his/her use of specific practices in order to increase the use of the practices (Casey &amp; McWilliam, 2008).</td>
<td>Artman-Meeker, Hemmeter, &amp; Snyder, 2014; Cain, Rudd, &amp; Saxon, 2007; Diamond &amp; Powell, 2011; Dunst &amp; Raab, 2010; Fox, Hemmeter, Snyder, Binder, &amp; Clarke, 2011; Kretlow, Wood, &amp; Cooke, 2009; Marturana, &amp; Woods, 2012; McCollum, Hemmeter, &amp; Hsieh, W, 2011; Mohler, Yun, Carter, &amp; Kasak, 2009; Neuman &amp; Cunningham, 2009; Neuman &amp; Wright, 2010; Ottley &amp; Hanline, 2014; Pianta, Mashburn, Downer, Hamre, &amp; Justice, 2008; Piasta, et al., 2012; Powell, Diamond, Burchinal, &amp; Koehe, 2010; Raver et al., 2007; Rudd, Lambert, Satterwhite, &amp; Smith, 2009; Tschantz &amp; Vail, 2000; Wasik &amp; Hindman, 2011; Wilson, Dykstra, Watson, Boyd, &amp; Crais, 2012</td>
</tr>
<tr>
<td>Guided reflection</td>
<td>Examination of one’s current performance in comparison to evidence-based practice to determine whether to continue or make changes to obtain the anticipated outcome (Rush, Sheldon, &amp; Raab, 2008, p.3).</td>
<td>Artman-Meeker et al., 2014; Marturana, &amp; Woods, 2012; Neuman &amp; Cunningham, 2009; Neuman &amp; Wright, 2010; Pianta et al., 2008; Wasik &amp; Hindman, 2011; Wilson et al., 2012</td>
</tr>
<tr>
<td>Brainstorming / problem-solving</td>
<td>Idea generation characterized by encouragement of a large quantity, variety and blending of ideas, in order to arrive at a creative solution to a specific dilemma (Isaksen, 1998; Richard, 2003).</td>
<td>Marturana &amp; Woods, 2012; Ottley &amp; Hanline, 2014; Wilson et al., 2012</td>
</tr>
<tr>
<td>Action planning / goal setting</td>
<td>Outlining a step-by-step plan to reach a specific outcome within an identified amount of time (Locke &amp; Latham, 2002).</td>
<td>Artman-Meeker et al., 2014; Fox et al., 2011; Marturana, &amp; Woods, 2012; McCollum et al., 2011; Neuman &amp; Cunningham, 2009; Neuman &amp; Wright, 2010; Kretlow et al., 2009; Pianta et al., 2008; Piasta et al., 2012; Tschantz &amp; Vail, 2000; Wasik &amp; Hindman, 2011; Wilson et al., 2012</td>
</tr>
<tr>
<td>Resource support</td>
<td>Provision of informational and material supports based on learner’s needs to achieve a specific outcome (Mott, 2006)</td>
<td>Artman-Meeker et al., 2014; Cain et al., 2007; Diamond &amp; Powell, 2011; Fox et al., 2011; Marturana, &amp; Woods, 2012; Piasta et al., 2008; Powell et al., 2010; Tschantz &amp; Vail, 2000; Wasik &amp; Hindman, 2011; Wilson et al., 2012</td>
</tr>
<tr>
<td>Demonstration</td>
<td>Modeling of a specific practice or type of lesson for the learner to observe (Neufeld &amp; Roper 2003) or the use of video exemplars to demonstrate the model practice (Artman-Meeker et al., 2014)</td>
<td>Artman-Meeker et al., 2014; Diamond &amp; Powell, 2011; Dunst &amp; Raab, 2010; Kretlow et al., 2009; Mohler, et al., 2009; Neuman &amp; Cunningham, 2009; Neuman &amp; Wright, 2010; Piasta et al., 2012; Tschantz &amp; Vail, 2000; Wasik &amp; Hindman, 2011; Wilson et al., 2012</td>
</tr>
</tbody>
</table>
It should be noted that some studies were more descriptive of the coaching process than others. Of particular interest is that all studies used performance feedback as a primary component of the coaching model. The salient features of coaching identified in Table 3 are similar to those identified in literature synthesis conducted by Artman-Meeker, Fettig, and Barton (2014): progress monitoring, relationship building, live and video modeling, reflection, role play, practice, action planning, performance-based feedback, planning for practice, use of manual, and help with instructional materials. Artman-Meeker et al. (2014) also found that only 51% of the studies they reviewed measured and reported fidelity to the coaching protocol.

**Coaching at a distance.** While many of the included studies examined face to face coaching, a few studies used distance technologies to deliver coaching. Diamond and Powell (2011) found a positive impact on teachers’ use of literacy enhancing strategies using a distance-coaching model involving teachers’ submission of eight videotapes over a ten to twelve week period. In turn, the coach provided written feedback, links to video exemplars, and video clips from the teachers’ actual practice to illustrate positive examples and missed opportunities. Marturana and Woods (2012) found the use of a distance-coaching package on early interventionists’ use of recommended home-visiting practices improved the quality of home-visits. The model included performance feedback, goal setting, resource support, and action planning, all delivered through audio and video-conferencing applications. Piasta et al. (2012) used face-to-face training sessions coupled with online coaching to improve communication-facilitating strategies. The model required teachers develop an action plan prior to
videotaping their instruction, to view the video, and to write a reflection based on their performance. The coach viewed the video and provided written feedback to the teacher. The teachers submitted videos every other week for fourteen weeks. One of the studies reviewed compared professional development with on-site coaching to professional development with distance-coaching (Powell et al., 2010). The researchers found both types of coaching to be successful. The distance-coaching model consisted of performance feedback based on video submissions and links to video exemplars. Finally, Artman-Meeker et al. (2014) provided email feedback based on video clips obtained by an onsite videographer employed by the research team to coach Head Start teachers on the use of the Pyramid model for supporting social-emotional competence. Given the findings of the studies as mentioned above, the salient features of coaching can be employed as part of a distance-coaching model.

A trend in distance coaching, which occurred in one of the included studies, is commonly referred to as “bug-in-ear” coaching (Ottley & Hanline, 2014). Bug-in-ear coaching occurs when the practitioner wears an audio transmitting device in his or her ear, allowing the coach to provide immediate instruction and feedback. Bug-in-ear coaching has been used in both preservice (Rock et al., 2009) and in-service (Goodman et al., 2008; Ottley & Hanline, 2014;) professional development, as well as in peer coaching models (Scheeler, Congdon, & Stansbery, 2010).

Evidence to support distance-coaching also exists in research outside of the reviewed studies. In a study by Ruble, McGrew, Toland, Dalrymple, & Jung (2013), distance-coaching was found to improve teacher fidelity to research-based practices at a
similar rate to on-site coaching. Further, the authors demonstrated positive outcomes for children whose teachers received coaching when compared to those whose teachers did not (Ruble et al., 2013). In a study examining the process involved in on-site compared to distance coaching, Powell and Diamond (2013) found that distance coaching focused more on core instructional practices than did the coaching that occurred on-site. The researchers assert that such a finding is expected, given the ability of a coach to review videos several times in a distance coaching model (Diamond & Powell, 2013).

**Training Teachers to Use ELOs**

While ELOs are positively perceived by teachers (e.g. Horn et al., 2000; Kurt & Tekin-Iftar, 2008), without careful planning and accountability, teachers do not follow through with the opportunities (McBride & Schwartz, 2003). In studying the effect of embedded strategies on children, researchers have found certain features of coaching to be effective in training teachers to implement ELOs with fidelity. Specifically, instruction coupled with performance feedback has been used to ensure use of ELOs with fidelity (McBride & Schwartz, 2003; Mudd & Wolery, 1987). In addition to instruction and performance feedback, some researchers used an embedded schedule (Daugherty et al., 2001; Horn et al., 2000; Woods et al., 2004). Embedded schedules serve as a written action plan for targeted skills, instructional strategies, and daily routines and activities in which to embed the instruction (Pretti-Frontczak & Bricker, 2004). Finally, Harjusola-Webb & Robbins (2012) used a combination of written material and meetings between teachers and researchers to support teachers’ implementation of a variety of embedded
strategies. The meetings included several of the salient features of coaching, including performance feedback, brainstorming, and resource support.

**Training teachers to embed communication promoting strategies.** A growing body of research exists that examines how to support teachers in the implementation of naturalistic communication promoting strategies. One practice that has promise in providing such support is performance feedback. Performance feedback has positively impacted the use of single strategies, such as expansions (Barton & Wolery, 2007), descriptive praise (Barton & Wolery, 2007; Hemmeter, Snyder, Kinder, & Artman, 2010) and responsive statements (Tschantz & Vail, 2000). Additionally, performance feedback has been studied as a tool to support implementation of sets of strategies or behaviors such as descriptive praise, pre-corrections, emotional labeling, language expansions and choice (Barton, Pribble, & Chen, 2013) environmental arrangement, prompting, modeling, and reinforcing (Kaiser et al., 2000), incidental teaching (Casey & McWilliam, 2008; Mudd & Wolery, 1987), expansions, choice making, questioning and commenting (Kohler, Anthony, Steighner, & Hoyson, 2001), and embedded learning opportunities including antecedent, response, consequence (Keen, Sigafoos, & Woodyatt, 2001; Kretlow et al., 2009; McBride & Schwartz, 2003; Schepis et al., 2000; Tate et al., 2005). While many researchers have delivered written or graphical feedback in person, email has also been found to be an effective tool for delivering feedback (Artman-Meeker et al., 2014; Barton et al., 2013; Barton & Wolery, 2007; Brown & Woods, 2011; Hemmeter et al., 2010). Ottley and Hanline (2014) utilized immediate feedback, in the form of BIE coaching, to increase teachers’ use of the following strategies: imitating, following the
child’s lead, expansions, positive reinforcement, offering choices, modeling, and time delay.

A Coaching Package to Support the Embedding of Naturalistic Strategies

While the studies mentioned above provide some guidance on supporting teachers in the implementation of milieu teaching strategies, further research is warranted. Specifically, some studies have examined the support mechanism (such as performance feedback) as the independent variable to lead to procedural fidelity of implementation milieu teaching (Casey & McWilliam, 2008; Mudd & Wolery, 1987). However, both mentioned studies utilized face-to-face feedback sessions. While Ottley and Hanline (2014) studied the use of distance technologies, the coaching did not include elements of procedural fidelity. In other words, the practice of coaching at a distance has not been studied as a professional development tool to lead to implementation of milieu teaching strategies with procedural fidelity. A robust coaching package, including all of the salient features described in Table 3 needs be studied.

The purpose of the current study is to examine the effect of coaching on teachers' implementation with procedural fidelity of milieu teaching strategies. The study adds to the literature base in three ways: (1) the core components of the coaching model are clearly articulated and fidelity to the coaching model is measured (2) the coaching is delivered using distance technologies, and (3) the coaching includes aspects of quantity (frequency) and quality (correct procedure) of teachers’ use of correctly implemented milieu teaching strategies. The current study seeks to answer the following research question: compared to a workshop-only baseline, to what extent does coaching increase
the number of correctly implemented milieu teaching strategies during the intervention condition?
CHAPTER II

METHOD

In Chapter II, I explain the method utilized to answer the research question: compared to a workshop-only baseline, to what extent does coaching increase the number of correctly implemented milieu teaching strategies during the intervention condition? I begin the chapter with a description of the participants and setting, followed by instruments and measures. Next, I describe the professional development workshop, ongoing coaching, and key technologies used in the data collection and the delivery of the coaching. Finally, I illustrate the design of the study.

Participants

The primary participants in the study were teachers of three to five-year-old children with disabilities. Four teachers participated; however, one teacher did not receive the intervention do to time constraints of the study and the ending of the school year. Therefore, Teacher 4 will not be included in the description or analysis. Teachers chose one child to focus on for the study. The purpose of focusing on one child was to support the teacher in using the correct milieu strategy for the child’s level of communicative functioning.

Teacher / Child Dyads

The researcher recruited participants from a group of teachers who attended a workshop on research-based practices. Each of the teachers provided informed consent to participate in the study and to be video recorded for the purposes of data collection and participation in the on-going coaching (See Appendix A). Criteria for inclusion in the
study included (a) expressed interest in participation, including willingness to participate in weekly coaching sessions; (b) provision of direct service to preschool aged children with IEPs; and (c) approval as an Early Childhood Special Education teacher per State of Michigan Department of Education. In Michigan, approved ECSE teachers have credentials as elementary teachers with specialized training in early childhood education and special education (Michigan Department of Education, Office of Special Education, 2014). According to Wolery and Ezell (1993), researchers must thoroughly describe participants in order to support possible replication. Therefore, the each of the four participants provided demographic and program specific data, which is addressed in subsequent sections of this chapter. Demographic data included: age, gender, ethnicity, the highest degree obtained, and number of years teaching. Additionally, teachers provided information concerning the amount of planning time, amount of time spent in formal meetings with other professionals, number of other adults in the classroom, number of children in the classroom, and total number of children on teacher’s caseload.

Each teacher chose one child to be the target recipient of the embedded naturalistic strategies. Each child’s parents provided consent for the child to participate in the study (See Appendix B). As a criterion for selection, each child was eligible for special education and had an Individual Education Program (IEP). Each child’s IEP included a documented concern in the area of expressive communication noted in the Present Level statement on the IEP and a corresponding goal. Further, the child’s functioning at the onset of the study needed to be at a level indicating that the naturalistic teaching strategies would be appropriate. For example, the naturalistic strategies promote
the use of functional language, are intended for use with children who are able to verbally imitate, and benefit children at early stages of expressive language development (Ingersoll, Meyer, Bonter, & Jelinek, 2010; Kaiser, Yoder, & Keetz, 1992; Yoder, Molfese, & Gardnера, 2011). Existing research on naturalistic strategies suggests that the strategies can be matched with specific child goals (Alpert & Kaiser, 1992; Christensen-Sandfort, & Whinnery, 2013; Rogers-Warren & Warren, 1980). For example, the model procedure may be used when a child is initially learning a skill, while the mand-model procedure is used to encourage generalization of the skill (Christensen-Sandfort, & Whinnery, 2013; Rogers-Warren & Warren, 1980). The time-delay procedure is used to encourage spontaneous language, while the mand-model procedure supports the reciprocal nature of language (Christensen-Sandfort, & Whinnery, 2013). The mand-model procedure may be used in the absence of a child’s initiation (Rogers-Warren & Warren, 1980). In contrast, the incidental teaching procedure requires a child’s initiation (Alpert & Kaiser, 1992). Once the teacher identified an appropriate child match for the scope of the study, parental consent was obtained for the child’s participation, as well as for the video recording. The teachers provided the following data on each participating child: age, gender, area of special education eligibility, amount of time in special education, and IEP goal related to communication.

**Teacher 1.** Teacher 1 was a 36 year-old Caucasian female with a Master’s Degree in Education and thirteen years of teaching experience. She taught two half-day sections of ECSE Program for children ages two years, six months to four. Other adults in the classroom included a co-teacher and a paraprofessional. For portions of the class session,
occupational, physical, and speech therapists were present one to two days per week. The total number of children on the teacher’s caseload was seventeen.

As a part of the teacher contract in the local district, Teacher 1 had regularly scheduled planning time. Teacher planning time occurred on Fridays when students were not present and parent participation activities were not planned - approximately three hours per week, three weeks per month. She participated in weekly team meetings with other professionals that occurred during a forty-five minute lunch time one to two times per week.

Child 1. Child 1 was a three-year-old female receiving special education for approximately one year at the initiation of the study. She attended the ECSE Program in the morning. She was eligible for special education under the eligibility category of Early Childhood Developmental Delay. In Michigan, to be eligible for special education as a child with an Early Childhood Developmental Delay, the child must demonstrate at least a 50% delay in one or more developmental domains (Michigan Department of Education, Office of Special Education, 2013). Child 1 demonstrated delays in the areas of communication, cognition, and motor skills. The child’s IEP goal related to communication was to express wants and needs using gestures paired with single words. At the beginning of the study, the child was able to indicate wants and needs by pointing to specific items or objects and using verbal approximations. For example, during an initial video sample, she handed a book to an adult and said “ba.” She initiated interactions with adults using conventional presymbolic behaviors, such as pointing, nodding, and looking at desired items. She imitated single words once given a verbal
prompt. She refused items by pushing them away and shaking her head or grimacing.

She initiated social greetings by waving and imitating an adult’s verbalization of “hi” or “bye.”

**Teacher 2.** Teacher 2 was a 34 year-old Caucasian female with a Master’s Degree in Education and ten years of teaching experience. She taught two half-day sections of ECSE Program designed specifically for children with characteristics indicative of Autism Spectrum Disorder. Other adults in the classroom included a paraprofessional, who was present daily, along with an occupational therapist, speech and language therapist, and physical therapist, all of whom were present intermittently. The total number of children on the teacher’s caseload was eight.

Teacher 2 participated in weekly planning time, as well as team meetings with other professionals. She received thirty minutes of planning time daily, as well as one full Friday two to three times per month. Teacher 2, the Speech and Language Therapist, and the School Social Worker met once a week, before school, for forty-five minutes.

**Child 2.** Child two was a four-year-old female who was eligible for special education under the eligibility category of Early Childhood Developmental Delay at the time of the study. She attended the ECSE Program during the morning session. The child had delays in the areas of communication, social-communication, and motor skills. She had been receiving special education for one year and six months at the time of the study. The IEP goal related to communication was to use 1-2 words to communicate wants/needs/requests. At the beginning of the study, the child indicated wants and needs attempting to obtain desired objects on her own. She would use single words to request
familiar, favored objects when provided a verbal model. She rarely initiated interactions with adults, but would respond to an adult, especially to fill in the blank of a familiar song or book. She refused items by pushing them away and walking away. She imitated social greetings but did not initiate them.

**Teacher 3.** Teacher 3 was a 31 year-old Caucasian female with nine years of teaching experience and a Master’s degree in education. She taught two half-day sections of ECSE Program designed for children with characteristics indicative of Autism Spectrum Disorder. Other adults in the classroom included one to two paraprofessionals who were present daily, as well as a speech and language therapist who was present weekly. The total number of children on the teacher’s caseload was eleven.

Teacher 3 received ninety minutes per day for planning time and lunch. She reported informally meeting with other professionals daily and having formal meetings one time per month for one hour. Professionals included in the formal meetings included other ECSE teachers in the school building.

**Child 3.** Child 3 was a four-year-old male receiving special education for approximately three years at the initiation of the study. He was eligible for special education under the eligibility category of Autism Spectrum Disorder. In Michigan, to be eligible for special education as a child with an Autism Spectrum Disorder, the child must demonstrate impairments in social interactions and communication, as well as unusual, repetitive or stereotypic behaviors (Michigan Department of Education, Office of Special Education, 2013). Child 3 had the following IEP goal related to communication: to use 1-2 words to request and comment. At the beginning of the study,
the child typically indicated wants and needs by attempting to access the desired object. If he was not able to meet his own needs, he would bring an adult to the item. He used single words to request familiar objects, typically after asked “What do you want?” He refused items by pushing them away, screaming, or crying. He imitated social greetings once modeled by an adult. He imitated adult verbalizations made during play, but did not use words to comment during his own play.

**Summary of teacher and child data.** Please see Tables 4 and 5 for a summary of relevant details concerning teachers and children, respectively.

Table 4

*Teacher Information*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Age</th>
<th>Degree</th>
<th>Years</th>
<th>Planning time</th>
<th>Meetings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher 1</td>
<td>36</td>
<td>M. Ed.</td>
<td>13</td>
<td>3 – 5 hours per week</td>
<td>45 minutes (during lunch) 1-2 per week</td>
</tr>
<tr>
<td>Teacher 2</td>
<td>34</td>
<td>M. Ed.</td>
<td>10</td>
<td>30 minutes per day + 2 full days per month</td>
<td>45 minutes per week</td>
</tr>
<tr>
<td>Teacher 3</td>
<td>31</td>
<td>M. Ed.</td>
<td>9</td>
<td>90 minutes per day (includes lunch)</td>
<td>60 minutes per month</td>
</tr>
</tbody>
</table>

Table 5

*Child Information*

<table>
<thead>
<tr>
<th>Child</th>
<th>Age</th>
<th>Gender</th>
<th>Eligibility</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child 1</td>
<td>3</td>
<td>Female</td>
<td>ECDD</td>
<td>Express wants and needs using gestures paired with single words.</td>
</tr>
<tr>
<td>Child 2</td>
<td>4</td>
<td>Female</td>
<td>ECDD</td>
<td>Use 1-2 words to communicate wants/needs/requests.</td>
</tr>
<tr>
<td>Child 3</td>
<td>4</td>
<td>Male</td>
<td>ASD</td>
<td>Use 1-2 words to request and comment.</td>
</tr>
</tbody>
</table>
Setting

Classroom 1 was located in a local district of approximately 8,000, 9.4% of whom have IEPs. The daily schedule consisted of the following activities: large group, small group, free choice, snack, music & movement, and outside time. The class consisted of nine students with and without disabilities. The program operated for three hours per day Mondays through Thursday. Additionally, one Friday per month was used for family participation and instruction.

Classroom 2 was located in a school district of approximately 4,700 students, 9.3% of whom had IEPs. The daily schedule consisted of sensorimotor activities, circle time, gym, snack, individual work, and free play/choice. The class consisted of three children, all of whom were eligible for special education. The program operated Monday through Thursday, for three hours per day.

Classroom 3 was located in a school district of approximately 4,500 students, 16.3% of whom had IEPs. The daily schedule consisted of the following activities: breakfast, large group, small group, free play, recess, and snack. Six children, all of whom were eligible for special education, attended the program. The ECSE Program operated Monday through Friday for two hours and thirty minutes per day.

Instruments and Measures

The researcher developed three measures in order to collect data concerning (1) the number of correctly implemented milieu teaching strategies delivered by the teacher, (2) the fidelity of the coaching model, and (3) the teachers’ perceptions concerning the value of the coaching. The description of each measure includes definitions and
examples of the type of information gathered, as well as procedures for administering the tool.

**Embedded Recording Measure**

The Embedded Recording Measure was used to measure the dependent variable: number of correctly implemented milieu teaching strategies embedded into child-directed activities (See Appendix C). The core components of naturalistic strategies served as a basis for the measure. The core components of an embedded naturalistic strategy are: (1) an antecedent for the teaching episode, (2) child communicative behavior/response, and (3) a contingent adult response (Hemmeter & Kaiser, 1994; Hancock & Kaiser, 2002; Kaiser et al., 2000). An antecedent is “any event, action, condition that is designed, selected, or occurs to provide a learning opportunity” (Pretti-Frontczak, 1998). Table 6 lists the possible antecedents related to environmental and responsive strategies; while Table 7 lists antecedents related to the model, mand-model, time delay, and incidental teaching strategies. Both types of antecedents needed to be present during each occurrence.

Table 6  

*Antecedents Related to Environmental and Responsive Strategies.*

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>Adult limits access to desired material or activity to elicit a communicative response from the child (Ostrosky &amp; Kaiser, 1991).</td>
</tr>
<tr>
<td>Unexpected event</td>
<td>Adult performs an action that is different than what the child expects (Ostrosky &amp; Kaiser, 1991).</td>
</tr>
<tr>
<td>Insufficient materials</td>
<td>Child is not given enough or correct materials needed (Ostrosky &amp; Kaiser, 1991).</td>
</tr>
<tr>
<td>Nonverbal imitation</td>
<td>Adult performs the same actions on objects as the child (Delaney, Ezell, Solomon, Hancock, &amp; Kaiser, 1997).</td>
</tr>
<tr>
<td>Verbal mirror</td>
<td>Adult engages in nonverbal imitation and describes the movements (Delaney, et al., 1997).</td>
</tr>
<tr>
<td>Follow child’s lead</td>
<td>Adult becomes involved in what the child is doing, relating his or her behavior to the object or activity of the child’s focus (Hancock &amp; Kaiser, 2002).</td>
</tr>
</tbody>
</table>
Table 7

*Antecedents Related to Milieu Strategies.*

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child initiated</td>
<td>Child initiates a communicative exchange.</td>
</tr>
<tr>
<td>Model</td>
<td>Adult says a word, phrase, or sentence based on the focus of child’s attention with the intention that the child will imitate what is said (Delaney, et al., 1997).</td>
</tr>
<tr>
<td>Mand</td>
<td>Adult asks a wh- question or makes a statement that requires a verbal response from the child (a wh-question, a choice) (Delaney, et al., 1997).</td>
</tr>
<tr>
<td>Time delay</td>
<td>Adult pauses in familiar routine or activity with expectant look with the intention that the child will verbalize (Delaney, et al., 1997).</td>
</tr>
</tbody>
</table>

Child directed activities are unstructured activities during which the child makes choices concerning the activity in which he or she engages (Qi, Kaiser, & Milan, 2006). In order to ensure that the participants were targeting child directed activities as the context for the strategies, the researcher reviewed the classroom schedule with each teacher to identify specific activities. Examples of child directed activities include play time, choice time, and playground. All teachers focused on play or choice time for the context of the study.

**Fidelity of embedded strategy implementation.** The researcher measured both quantitative and qualitative features to ensure correct implementation. While the implementation of the teacher delivered strategies was measured in a quantitative manner (i.e. using a frequency count), qualitative aspects were measured, as well. In order for a strategy to be considered correctly implemented, all of the following criteria needed to be met: (a) at least one environmental or responsive strategy was utilized, (b) all procedural steps for the specific milieu strategy were followed, (c) the teacher did not interfere with the child’s focus or interest, and (d) the teacher provided the correct contingent consequence. The correct consequences were (1) access to the material (if a request was
made) and continuation of the activity and (2) an expansion of the child’s language. If the child did not demonstrate the target behavior, the correct adult consequence was an additional, more controlling prompt followed by (1) access to the material (if a request was made) and continuation of activity and (2) an expansion of the child’s language. See Figure 3 for two examples of correctly implemented strategies.

**Figure 3.** Correctly implemented milieu teaching strategies.

**Coaching Fidelity Measure**

The Coaching Fidelity Measure was used to monitor implementation of the independent variable: a performance feedback based coaching package based on the salient features of coaching described in Chapter I. It was important to make sure each coaching session was standardized and delivered the same fashion to all of the teacher participants. The coaching package contained the following features: performance feedback, guided reflection, brainstorming with problem-solving, action planning with goal setting, demonstration, and resource support. The Coaching Fidelity Measure was used to guide each coaching session. Additionally, the Coaching Fidelity Measure was
completed after each coaching session to ensure that all steps of the coaching package were delivered. See Table 8 for descriptions of the coaching features and Appendix D for the Coaching Fidelity Measure.

Table 8

**Description of Coaching Features**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance feedback</td>
<td>Researcher showed teacher examples (from his or her submitted video recording) of correct use of naturalistic strategies, highlighting antecedent, response, consequence. Researcher showed teacher examples (from his or her submitted video recording) of incomplete instructional units, missed opportunities, or provided ideas on how to improve overall delivery of complete instructional units, highlighting possible ways to increase antecedents or provide consequences.</td>
</tr>
<tr>
<td>Guided reflection</td>
<td>Following the review of the video examples, the researcher asked the teacher to compare her performance to the critical components of the naturalistic strategies, using the Critical Components Checklist.</td>
</tr>
<tr>
<td>Brainstorming / Problem solving</td>
<td>The researcher and teacher generated ideas to arrive at a solution to a specific dilemma</td>
</tr>
<tr>
<td>Action planning / Goal setting</td>
<td>The researcher recorded the teacher’s identified goal for the upcoming week on the Critical Components Checklist.</td>
</tr>
<tr>
<td>Demonstration</td>
<td>The researcher showed and explained video examples of correct implementation of strategies.</td>
</tr>
<tr>
<td>Resource support</td>
<td>The researcher sent an email of the completed Core Components within 24 hours of coaching session or researcher sent additional information (i.e. link to a website, article, or document) to support the teacher’s implementation.</td>
</tr>
</tbody>
</table>

**Teacher Perception Survey**

It is important to establish social validity in multiple baseline studies. In other words, a key tenant is the focus on high levels of importance of the dependent variable, as well as ease of use of the independent variable (Gast & Ledford, 2010). In order to measure the teachers’ perceptions of the value of the overall coaching experience, along with the value of the embedded milieu teaching strategies, the researcher developed the Teacher Perception Survey (See Appendix E). Teachers rated their level of agreement – strongly agree, agree, neutral, disagree, strongly disagree – with eleven statements.
Examples of the statements are (a) embedding naturalistic learning opportunities in child focus activities is in line with my philosophy of how young children learn; (b) the verbal feedback helped me to embed more learning opportunities into child focused activities; (c) the feedback sessions were a good use of my time; and (d) reviewing the video examples helped me to better understand embedded learning. The survey was conducted using Survey Monkey ©, an online tool. The survey was administered following the last coaching session for each teacher and was voluntary and anonymous.

**Professional Development**

Since the purpose of the study was to examine coaching as a form of professional development designed to support implementation of strategies learned during a workshop, it is important to examine the various aspects related to the professional development. The researcher delivered both the initial workshop and the ongoing coaching. The researcher is a training and technical assistance provider at the regional service agency in which the teachers work. As a training and technical assistance provider, her work includes providing several professional development workshops for teachers each year, as well as provision of technical assistance for compliance. She does not have supervisory responsibilities.

**Initial Workshop**

All teachers participated in a face-to-face workshop focused on the embedding of naturalistic strategies into child-directed activities. Thirty participants representing seven different school districts participated in the initial workshop. The professional development workshop took place at the training facility for the regional service area
over the course of two days. The workshop included lecture, case study, role-play with feedback, and video examples. The training materials included a PowerPoint presentation (see Appendix F), a manual adapted from Harjusola-Webb & Robbins (2012), a concept map illustrating when to use specific strategies (see Appendix G), a checklist illustrating the critical components of the naturalistic strategies (see Appendix H), and a plan describing the instructional procedures, which was completed by the teacher, during or following the workshop (see Appendix I). Following the workshop, all teachers developed a plan to match specific milieu strategies, including procedures for the strategies, to the individual target child.

**Naturalistic strategies content.** Specific practices addressed during the workshop included environmental arrangement, following the child’s lead, engaging the child, expanding utterances, model procedure, mand-model procedure, time delay, incidental teaching, and providing meaningful verbal feedback. See Table 9 for definitions of the various strategies.

Table 9

*Strategies Addressed in the Workshop*

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Arrangement</td>
<td>Promoting child’s communicative behavior by controlling access to items of interest, performing an action that is different than what the child expects and/or providing insufficient materials needed to accomplish a familiar task (Ostrosky &amp; Kaiser, 1991).</td>
</tr>
<tr>
<td>Following the child’s lead</td>
<td>Adult becomes involved in what the child is doing, relating his or her behavior to the object or activity of the child's focus (Hancock &amp; Kaiser, 2002).</td>
</tr>
<tr>
<td>Engaging the child</td>
<td>Establishing joint attention with the child by imitating his or her motor actions and/or narrating the actions (Hancock &amp; Kaiser, 2002).</td>
</tr>
<tr>
<td>Expanding utterances</td>
<td>The adult responds to the child’s communication by extending the meaning or idea or improves the grammar or complexity of the</td>
</tr>
<tr>
<td>Strategy</td>
<td>Definition</td>
</tr>
<tr>
<td>------------------------------</td>
<td>------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Model procedure</td>
<td>Specific milieu strategy initiated when the adult says a word, phrase, or sentence based on the focus of child's attention with the intention that the child will imitate the word (Delaney et al., 1997).</td>
</tr>
<tr>
<td>Mand-model procedure</td>
<td>Specific milieu strategy initiated when adult asks a wh-question or makes a statement that requires a verbal response from the child (a wh-question, a choice) (Delaney et al., 1997).</td>
</tr>
<tr>
<td>Time delay</td>
<td>Specific milieu strategy initiated when adult pauses in familiar routine or activity with an expectant look with the intention that the child will verbalize (Delaney et al., 1997).</td>
</tr>
<tr>
<td>Incidental teaching</td>
<td>Specific milieu strategy initiated when the child communicates and the adult utilizes the model, mand-model, or time delay procedure to illicit a more advanced behavior (McCormick, 2014).</td>
</tr>
<tr>
<td>Proving meaningful verbal feedback</td>
<td>Adult’s response to the child’s communicative behavior (McCormick, 2014).</td>
</tr>
</tbody>
</table>

**Ongoing Coaching Protocol**

To support the teachers’ correct implementation of the milieu teaching strategies, the researcher provided weekly coaching to the teachers. First, the teachers submitted video files of themselves and the children in the classroom during a designated child-directed activity (such as play, choice, or centers). Next, the researcher reviewed and coded the video using the Embedded Recording Measure. Last, the researcher planned a coaching session with the participant. Each teacher participated in the coaching sessions individually in their classrooms or offices during their lunchtime, planning time, before school, or after school.

The coaching was standardized and yet individualized to each teacher. The researcher used the Coaching Fidelity Measure during each coaching session to ensure the standardization of the coaching package. The coaching was individualized in the following ways (a) each teacher received specific supportive and corrective performance
feedback (Barton, Kinder, Casey & Artman, 2011); (b) each teacher was asked to evaluate her own performance; and (c) each teacher was asked to set a goal using the information and ideas shared during the coaching session.

**Technology**

Technology was a key component in the current study. Rather than observing teachers in their own classroom, the researcher accesses video files submitted by each teacher. Additionally, the researcher utilized technology in the delivery of the coaching package. The following section includes descriptions of the technologies.

**Video Files.** Each teacher submitted video files of their implementation of the milieu teaching strategies according to their plans. The videos were at least 10 minutes in length. Teachers submitted the video files via upload into a secure virtual Dropbox. The Dropbox was password protected, and no one except the study personnel had access to download or view the videos.

**Adobe Connect.** The coaching occurred online using Adobe Connect ©, a web-based video-conferencing software application. The use of Adobe Connect © allowed the coach and the teacher to meet synchronously. The researcher utilized the screen-share capability of the application to view videos with the teacher, make notes during the brainstorming / problem-solving session, and record goals and written feedback.

**Design**

Single subject research design was used to determine whether a functional relationship existed between the coaching package and the teachers’ correct implementation of the milieu teaching strategies. A single subject research design is a
viable option when between group designs are not practical, reasonable, or possible (Kazdin, 2011; Odom et al., 2005). For the current study, a single subject research design was chosen due to the small number of participants interested in engaging in the implementation support following the workshop. Even though thirty people participated in the workshop, the coaching was optional. Therefore, an experimental or quasi-experimental between group design would not have been practical or possible.

A particular type of single subject research design, multiple baseline design across participants, was chosen because each teacher would be implementing the strategies in her classroom. Since a multiple baseline design allows the effectiveness of the intervention to be established if the performance of each individual changes when intervention is applied (Kazdin, 2011; Kratochwill et al., 2010), the specific design effectively addressed the relationship between the introduction of the coaching package and the correct implementation of the milieu teaching strategies.

The research design included workshop only baseline and coaching intervention phases. In a multiple baseline design, the introduction of the independent variable occurs at different times with at least three different participants in order to establish experimental control (Kratochwill et al., 2010; Odom et al., 2005). For the current study, the independent variable was introduced to each participant when the following conditions applied: a predictable baseline data path was established, the frequency of implementation was low, a neutral or descending trend was evident, and each participant had at least five baseline data points (Kazdin, 2011; Kratochwill et al., 2010; Wolery & Harris, 1982). Additionally, each participant in intervention phase must show effect
before the independent variable is introduced to sequent participants (Kratochwill et al., 2010). For a multiple baseline design, it is necessary to ensure stable baseline performance, if possible, and staggered introduction of the independent variable, rather than consistent length of time between each introduction (Kazdin, 2011); therefore, the decision to move into intervention phase depended upon the performance of each participant and is discussed in Chapter III: Results.

**Threats to Validity**

It is necessary for researchers to address possible threats to internal and external validity, and control for such threats. For studies utilizing a single subject research design, internal and external threats are controlled by the structure of the study, as well as replication of the effect following the implementation of the intervention (Kratchowill et al., 2010). For example, the threats of history, testing, and maturation are limited if the dependent variable is stable until the independent variable is introduced, and an immediate result is demonstrated and replicated across each participant (Gast & Ledford, 2010). Statistical regression and selection are controlled by ensuring that participants are not selected for the study or to enter into intervention phase based on extreme performance (Kratchowill et al., 2010). Ambiguous temporal precedence is not likely a threat if the timing of the introduction of variables is clear (Kratchowill, 2010). Instrumentation is controlled by ensuring acceptable levels of inter-rater reliability (Gast & Ledford, 2010). Attrition is controlled if at least five data points are collected per phase per condition, and results are replicated across at least three administrations of the intervention (Kratchowill et al., 2010). Threats to external validity are also controlled by
the demonstration of a repeated pattern of similar results across at least three conditions
(Horner et al., 2010).

**Workshop Baseline**

During the baseline phase of the study, the teachers were instructed to record
themselves implementing the strategies according to the plans created during the
workshop. All teachers submitted three videos during the first week of baseline. The
videos were coded using the Embedded Recording Form in order measure the correct
implementation of the milieu teaching strategies. The researcher communicated with the
teachers to acknowledge the receipt of the videos but did not provide any coaching or
substantive feedback. The length of the baseline phase varied by teacher.

**Coaching Intervention**

For the current study, the intervention phase began for each teacher upon the
receipt of the first coaching session. Following the first coaching session, teachers were
instructed to continue recording the implementation of the strategies during the
designated activity while incorporating the action plan developed during the coaching
session. Teachers continued to submit video files one to two times per week, while the
coaching took place on a weekly basis. The videos were coded using the Embedded
Recording Form in order measure the correct implementation milieu teaching strategies.
The length of the coaching intervention phase varied by teacher: nine weeks for Teacher
1, seven for Teacher 2, four for Teacher 3. Teacher 4 did not enter into the coaching
intervention phase.
**Interobserver Agreement**

A second observer coded at least 20% of each participant’s baseline and intervention videos in order to determine inter-observer agreement. According to Kratchowill et al. (2010), acceptable inter-observer agreement is obtained when at least 20% of each phases’ data points are coded by a second observer, and the percent of agreement is at least 80%. The second observer was trained using a Coding Manual, adapted from several tools used to measure embedded naturalistic strategies, and recorded videos. See Appendix J for the Coding Manual. The second assessor independently watched and coded practice videos and compared results with the primary researcher to build reliability. Once the primary researcher and second assessor were able to attain 80% reliability, the second assessor rated 20% of each participant’s baseline and intervention videos. Agreement ranged from 81%-100% concerning Teacher 1, 86%-100% for Teacher 2, and 83%-100% for Teacher 3. Teacher 4 remained in baseline phase for the duration of the study. Agreement was 100% for Teacher 4.

**Summary**

In conclusion, the current study examined the provision of a coaching package delivered through the use of distance technologies to increase teacher use of correctly implemented milieu teaching strategies with procedural fidelity. The coaching model contained elements identified through a literature synthesis on coaching in early childhood education and early childhood special education. The coaching model specifically focused on the embedding of milieu teaching strategies into child-directed activities in a preschool classroom. In the next section, I will discuss the findings.
CHAPTER III

RESULTS

In Chapter III, I present the results of a multiple baseline across participants design developed to ascertain whether a functional relationship between a coaching package and number of correctly milieu teaching strategies can be established. I begin by presenting the discussing the fidelity of implementation of the coaching intervention. I present a visual analysis of the results and effect size calculations for each participant. Next, I discuss the decision-making process to move from baseline phase to the intervention phase for each participant. Finally, I discuss the social validity of the coaching intervention.

Coaching Fidelity

The Coaching Fidelity Measure was used during each coaching session to ensure all salient features of the coaching model were utilized. In addition, all coaching sessions were recorded and reviewed to ensure adherence to the coaching model. All six salient features of the coaching package were delivered during 100% of the coaching sessions. A second observer independently reviewed 20% of the coaching sessions and found 100% adherence.

Visual Analysis

In order to determine the effect of the coaching intervention package on the number of correctly implemented milieu strategies, the researcher conducted a variety of visual analyses of the data. According to Kazdin (2011), visual analysis of single subject design data reduces the likelihood of finding effect from an intervention when no effect
was present. The visual analysis involves both within phase comparisons, as well as between phase comparisons. Within each phase, the numeric range of data is reported, as well as the level, trend, and stability of the data (Kratochwill et al., 2010; Odom et al., 2005; Wolery & Harris, 1982). Data are compared between each phase to determine the percentage of overlapping data and the immediacy of change (Kratochwill et al., 2010; Odom et al., 2005; Wolery & Harris, 1982). The level was determined by calculating the mean of the number of correct strategies during each phase of the study (Horner et al., 2005; Kratochwill et al., 2010; Wolery & Harris, 1982). The trend was calculated using the split-middle method. The split-middle method involves graphing each datum point and comparing the medians of each half of the data (Gast & Spriggs, 2010; Gischlar, Hojnoski, & Missal, 2009; Wolery & Harris, 1982). Stability was examined by identifying the percentage of the data that fall within twenty percent of the median value of all data points within each phase (Gast & Spriggs, 2010). In addition, the data between phases was examined for the immediacy of change that occurred following the introduction of the coaching intervention and overlap between baseline and intervention phase (Kratochwill et al., 2010; Odom et al., 2005). In order to establish a functional relationship, visual analysis of the data must demonstrate an effect across at least three different administrations of the intervention (Horner et al., 2005; Kratochwill et al., 2010).

Three teachers received the coaching intervention. The fourth teacher remained in baseline phase due to the ending of the school year. Figure 4 depicts the frequency of correctly implemented strategies across all phases by the three teachers who received the
coaching intervention. Coaching sessions occurred weekly, while teachers submitted video files one to three times per week. In order to clearly discern when each coaching session occurred, the data point immediately following the coaching session is designated by a “c” placed directly above the data marker.

**Baseline to Intervention**

In the next section, I will present the results of the within phase and between phase data analysis across baseline and intervention for the three teachers who received the coaching intervention.

**Teacher 1.** During the workshop baseline phase of the study, Teacher 1 delivered a range of zero to two ($M = 0.8$) correct milieu strategies. The data path was predictable, the frequency of implementation was low and the trend was descending. Following the initial workshop, Teacher 1 developed a plan to support the child’s use of single words to request, comment, or label. Since the child was able to imitate words when prompted, the teacher planned to use all of the environmental and responsive strategies with the specific milieu strategy of mand-model. During the recorded sessions, Teacher 1 demonstrated use of several environmental and responsive strategies. She followed the child’s lead by noticing the object of the child’s interest and becoming involved with the item. She used strategies to engage the child and establish joint attention, such as mirror and imitation. Additionally, she limited access to desired objects, encouraging the child to use words to request.
Figure 4. Frequency of correctly implemented strategies.

C - Indicates data collected for session immediately following a coaching session.
While the teacher did demonstrate some antecedent strategies, her use of the milieu teaching strategies was inconsistent and incomplete. The teacher prompted with wh- questions such as “What do you want?” or “What is this?”; however, she rarely completed the learning opportunity correctly. For example, she would honor the request by giving the child the requested item, but she did not expand the utterance. Further, if the child did not respond with the correct label or word, the teacher did not provide corrective feedback. Finally, when the child initiated communication, the teacher did not prompt to elicit more advanced language.

The baseline phase lasted two weeks, during which five data points were collected. The researcher delivered the first coaching session following the fifth data point, at the end of week two. The child participant was absent from school during week three; therefore, intervention data collection began during week four.

During the coaching intervention phase, Teacher 1 delivered a range of 6 to 22 ($M = 13.5$). The trend was neutral and 43% of the data fell within 20% of the median. A comparison of data between phases reveals zero overlapping data points between baseline and intervention phase. The number of correctly implemented milieu strategies increased immediately upon the introduction of the coaching, from zero at the end of baseline to eleven at the beginning of intervention.

In all, Teacher 1 participated in eight coaching sessions lasting between 20 and 30 minutes. She submitted one to two videos between each coaching session. The teacher did not participate in a coaching session during week nine of the study due to abnormalities in her schedule and the inability to find an agreeable coaching time.
**Teacher 2.** During the workshop baseline phase of the study, Teacher 2 delivered a range of zero to five ($M = 2.6$) correct milieu strategies. The data path was predictable, the frequency of implementation was low, and the overall trend was neutral. Following the workshop, Teacher 2 decided to address the use of single words to request objects or activities. The child was in the acquisition phase of learning to use words to request. She was able to imitate single words following a model; however, she did not initiate communication with words. The teacher chose to implement all of the environmental and responsive strategies, along with the milieu strategy of modeling. Prior to receiving any coaching support, the teacher demonstrated following the child’s lead and controlling access to items of interest. She did not use the strategies designed to engage the child and establish joint attention.

Concerning the use of the modeling strategy, the teacher provided several complete learning units, including an antecedent and feedback. However, she rarely implemented the model with procedural fidelity. In other words, she did not follow all of the steps in the procedure. Specifically, she did not expand the child’s language. The teacher provided several learning opportunities to request the same item (bubbles) repeatedly, without allowing for or encouraging more elaborate behavior.

The baseline phase lasted four weeks and contained nine data points. Teacher 2 received her first coaching session during week five of the study, after Teacher 1 had submitted four intervention videos. Due to the absence of Teacher 1’s target child, she was not able to submit data during week three. However, she was able to submit two video files for week four and two more early in week five. The coaching session for
Teacher 2 occurred mid-week, and she was able to submit one video file the same week. The decision to implement the coaching intervention with Teacher 2 was made for due to the predictable baseline data, low frequency of implementation, neutral trend, and the immediate and notable change in level from workshop baseline to coaching intervention phase for Teacher 1.

During the coaching intervention phase, Teacher 2 delivered a range of 10 to 22 ($M = 16.3$). The trend changed from neutral during baseline to ascending during intervention, and 64% of the data fell within 20% of the median. There were zero overlapping data points between the phases. The number of correctly implemented milieu strategies increased immediately upon the introduction of the coaching, from zero at the end of baseline to 10 at the beginning of intervention.

Teacher 2 participated in a total of eight coaching sessions lasting between 20 and 40 minutes. She submitted one to two videos between each coaching session. The number of correctly implemented strategies increased after each of the first five coaching sessions. The correct implementation dipped slightly following the last three coaching sessions. However, the number remained relatively stable during those three weeks, ranging from 17 to 22.

**Teacher 3.** During the workshop baseline phase of the study, Teacher 3 delivered a range of zero to five ($M=1.9$) correct milieu strategies. The data were predictable, the frequency of implementation was low, and the trend was descending. Following the workshop, Teacher 3 decided to address increasing the child's length of utterance. The child was able to request desired objects or activities; however, he only used single words
to do so. The teacher chose to implement all of the environmental and responsive strategies, along with the milieu strategy of incidental teaching. Prior to receiving any coaching support, the teacher followed the child's lead and engaged in imitation and mirroring to establish joint attention. She did not use the strategies to set up the environment to promote communication, such as limiting access to the desired material or performing an unexpected action. Concerning the use of the incidental teaching strategy, the teacher rarely expanded the child's language or prompted for additional language. The teacher missed several opportunities, evidenced by the child using a word to request an object and not receiving a response.

The baseline phase lasted 8 weeks and contained 13 data points. Teacher 3 received her first coaching session at the end of week eight of the study; therefore, her first intervention data point was collected during week nine. The researcher chose to begin the coaching intervention with Teacher 3 due to the predictable baseline data, low frequency of implementation, descending trend, and the immediate increase in frequency of implementation shown by Teachers 1 and 2. Teacher 3’s target child was absent during week six of the study, thereby delaying the start of the coaching intervention phase.

During the coaching intervention phase, Teacher 3 delivered a range of 7 to 25 ($M = 14.7$) correct milieu strategies. The trend was decelerating and 14% of the data fell within 20% of the median. There were zero overlapping data points between phases. The number of correctly implemented milieu strategies increased immediately upon the
introduction of the coaching, from zero at the end of baseline to 20 at the beginning of intervention.

In all, Teacher 3 participated in four coaching sessions lasting between 25 to 30 minutes. She submitted two videos between each coaching session. The number of correctly implemented strategies increased after coaching session one, three, and four. The number decreased following coaching session two.

**Effect Size**

Although visual analysis is the most commonly utilized method of determining results of single subject research, the need for increased rigor, objectivity and accountability have drawn attention to the need for determining and reporting effect size (Parker, Cryer, & Byrns, 2006; Parker & Hagan-Burke, 2007). Calculation of effect size provides an objective method for comparing behaviors between phases, lending support to visual analyses (Parker et al., 2006). While debate exists regarding how to determine effect size in single subject research (Kratochwill et al., 2010), proposed methods research include regression based approaches and non-overlap metrics (Horner & Greenwood, 2012; Wendt, 2009; Wolery, Busick, Reichow, & Barton, 2010). Regression based approaches are often deemed to be unsuitable for use in single subject research due to the assumptions of normality, equal variance, and independence in the data, which are often not the case in single subject research (Wendt, 2009; Wolery et al., 2010). Nonoverlap methods do not rely on such assumptions (Wolery et al., 2010); however, each nonoverlap method has advantages and disadvantages concerning use in single subject research. In a study comparing four nonoverlap methods with visual analysis,
Wolery et al. (2010) found a high error rate across all four methods. Despite such concerns, effect sizes do offer a standardized way to examine the amount of behavior change demonstrated between baseline and intervention conditions (Parker, Vannest, & Brown, 2009), and nonoverlap procedures provide a way to efficiently evaluate effect (Wendt, 2009).

In order to estimate the effect size for the current study, several methods were considered. Given that there were no overlapping data points for any of the three participants, all of the following methods would yield a 1.0 effect size: improvement rate difference (IRD, Parker, et al., 2009); non-overlap of all pairs (NAP, Parker & Vannest, 2009); percentage of all nonoverlapping data (PAND, Parker, et al., 2007); pairwise data overlap squared (PDO2, Parker & Vannest, 2007); percentage of data exceeding the median (PEM, Ma, 2006); percentage of nonoverlapping data (PND, Scruggs, Mastropieri, & Castro, 1987). The only effect size calculation, which utilizes the baseline trend, is the Percentage of Data Exceeding a Median Trend (PEM-T) method (Wolery et al., 2010). The PEM-T method involves calculating the split middle line of trend and extending it through the intervention phase, determining the number of data points in intervention phase which fall above the line, dividing by the total number of data points in intervention phase. The effect size for all three teachers was 1.0 according to the PEM-T method of calculation.

**Summary of visual analysis and effect size.** Factors of the visual analysis that support the existence of a functional relationship between the coaching package and number of correctly implemented strategies include immediacy of change, lack of
overlapping data, and overall change in level across all three teachers. Additionally, a positive change in trend was present for two of the three teachers. The trend remained descending for Teacher 3. Table 10 displays a summary of the visual analyses and the effect size for each participant who experienced the coaching intervention.
<table>
<thead>
<tr>
<th>Condition Sequence</th>
<th>Baseline (Participant 1)</th>
<th>Intervention (Participant 1)</th>
<th>Baseline (Participant 2)</th>
<th>Intervention (Participant 2)</th>
<th>Baseline (Participant 3)</th>
<th>Intervention (Participant 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase Length</td>
<td>2 weeks</td>
<td>10 weeks</td>
<td>4 weeks</td>
<td>8 weeks</td>
<td>8 weeks</td>
<td>4 weeks</td>
</tr>
<tr>
<td></td>
<td>5 data points</td>
<td>14 data points</td>
<td>9 data points</td>
<td>14 data points</td>
<td>13 data points</td>
<td>7 data points</td>
</tr>
<tr>
<td>Median</td>
<td>1</td>
<td>13</td>
<td>3</td>
<td>17.5</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>Mean</td>
<td>$M=0.8, SD=0.8$</td>
<td>$M=13.5, SD=4.3$</td>
<td>$M=2.6, SD=1.8$</td>
<td>$M=16.3, SD=3.5$</td>
<td>$M=1.9, SD=1.4$</td>
<td>$M=14.7, SD=7.7$</td>
</tr>
<tr>
<td>Range</td>
<td>0-2</td>
<td>6-22</td>
<td>0-5</td>
<td>10-22</td>
<td>0-5</td>
<td>7-25</td>
</tr>
<tr>
<td>Change in level</td>
<td>+11</td>
<td>+10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trend direction</td>
<td>Descending</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Ascending</td>
<td>Descending</td>
<td>Descending</td>
</tr>
<tr>
<td>Stability</td>
<td>40% of data fall within 20% of median</td>
<td>43% of data fall within 20% of median</td>
<td>30% of data fall within 20% of median</td>
<td>64% of data fall within 20% of median</td>
<td>31% of data fall within 20% of median</td>
<td>14% of data fall within 20% of median</td>
</tr>
<tr>
<td>Effect size</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
</tbody>
</table>
Social Validity

The three teachers who received the coaching intervention participated in the Teacher Perception survey. According to the survey, all three teachers strongly agreed that embedding naturalistic learning strategies into child-directed activities improves child outcomes and is in line with their philosophy of how children learn. The teachers also strongly agreed that the verbal feedback highlighted positive experiences and that the video examples helped them to better understand embedded learning. The teachers either strongly agreed or agreed that the feedback sessions were a good use of their time and helped them to utilize the strategies addressed in the workshops. When asked to share their own feedback on the experience, the teachers made various comments including “The weekly meetings were very helpful to discuss specific examples of my interactions with the student” and “I learned so much and am now a better teacher for participating.” One teacher noted “This sort of long-term professional development with a regular follow-up component and individual coaching was a lot more helpful for implementing strategies than one-time workshops.”

Summary

Several factors of the visual analysis support the existence of a functional relationship between the coaching package and number of correctly implemented strategies. Additionally, the coaching intervention showed a 1.0 effect size for all three participants, as calculated using the PEM-T method. In the next chapter, I further explain the findings, specifically as they converge with and diverge from existing research. Additionally, I address implications and limitations of the study.
CHAPTER IV

DISCUSSION

Even though research exists regarding effective practices for working with children with disabilities, teachers often struggle with implementing such practices in their classrooms (e.g., Campbell & Halbert, 2002; Greenwood, 2001; Odom et al., 2005; Odom & Wolery, 2003). The current study was designed to examine how to support fidelity of implementation of practices that are research-based and promote children’s communication, in early childhood special education classrooms. Specifically, the study examined the effect of a coaching package on three teachers’ use of correctly implemented milieu teaching strategies with children who had identified disabilities. The package was based on the salient features of coaching as defined in ECE and ECSE literature. The results of the study demonstrate a functional relationship between the coaching package and the number of correctly implemented milieu teaching strategies. In this chapter, I address how the current study aligns with, and contributes to, the literature on implementation with fidelity. Additionally, I explain the findings, and examine the limitations and future directions.

Convergence and Divergence

The results align with previous implementation research that utilized coaching as a mechanism to support professional development. Specifically, the current study used a coaching package based on similar features to those in existing ECE and ECSE research delivered through distance technologies. The study contributes to the literature by
examining aspects of quality related to teacher practice and articulating the core components of the coaching package.

**Effectiveness of Coaching**

The results of the current study are aligned with previous studies supporting the use of coaching as an interaction style with teachers to foster the fidelity of implementation of strategies learned in workshops and other forms of professional development (e.g. Cain et al. 2007; Dunst et al., 2010; Kretlow et al., 2009; Marturana & Woods, 2012; Piasta et al., 2012; Powell et al., 2010; Raver et al., 2007; Rudd et al., 2009; Wasik & Hindman, 2011; Wilson et al., 2010). The coaching model used in the study met recommended practices for the provision of professional development activities (NAEYC, 1993; Miller & Stayton, 2005). Specifically, the coaching focused on (a) the context of daily teaching, (b) knowledge and skills learned in the workshops, (c) providing a mechanism for support, and (b) improved adherence to fidelity of use of the practices. The current study utilized similar features as previous studies, such as provision of written feedback (Diamond & Powell, 2011; Piasta et al., 2012; Powell et al., 2010), provision of verbal feedback (Marturana & Woods, 2012), review of clips from the teachers’ submitted video files (Diamond & Powell, 2011; Piasta et al., 2012; Powell et al., 2010), demonstration in the form of examples (Diamond & Powell, 2011), action planning (Marturana & Woods, 2012; Piasta et al., 2012), reflection (Piasta et al., 2012), and resource support (Marturana & Woods, 2012).

**Utilization of technology.** The results support previous research findings that coaching may be conducted using distance technologies (Diamond & Powell, 2013;
Diamond & Powell, 2011; Marturana & Woods, 2012; Piasta et al., 2012; Powell et al., 2010; Ottley & Hanline, 2014; Ruble et al., 2013). The coaching model incorporated similar technologies as previous studies, such as video-conferencing software (Marturana & Woods, 2012; Ruble et al., 2013) and video recording tools (Artman-Meeker et al., 2014; Piasta et al., 2012; Powell et al., 2010; Ruble et al., 2013). Additionally, the coaching sessions were delivered synchronously, allowing for the teacher and coach to engage in conversations about the verbal performance feedback, as well as to engage in brainstorming, action planning, guided reflection, and demonstration (Marturana & Woods, 2012). The provision of resource support took place following the coaching session through emailed informational materials (Artman-Meeker et al., 2014; Diamond & Powell, 2011; Piasta et al., 2012; Powell et al., 2010).

In the current study, the use of technology allowed the coach and teacher to meet weekly without having to travel. The regional service area spans approximately 900 square miles. Given the distance between the teachers’ locations, the approximate travel time for the coaching sessions would have been 12 hours. Additionally, the use of technology for video recording and uploading to the secure Dropbox limited the amount of time required to perform the observations. Observations alone would have required 13 hours of travel time. Rather than requiring over 25 hours of time to provide the coaching, the current model required approximately 60 to 90 minutes per week per participant. The time was used to code the videos (approximately 20 minutes per video) and participate in the coaching session (20 to 40 minutes) and follow-up work (20 to 30 minutes).
Limited Effectiveness of Workshops

The results of the study corroborate findings that on-going and performance specific support is needed to ensure implementation of strategies addressed in workshops (Neuman & Cunningham, 2009; Neuman & Wright, 2010; Mudd & Wolery, 1987). Prior to receiving coaching, all teachers created a written plan for embedding the instructional strategies into child-directed activities. The plans were similar to the embedding schedules used by researchers to support teachers’ use of ELOs (Daugherty et al., 2001; Horn et al., 2000; Woods et al., 2004). Additionally, all teachers received a manual explaining the strategies similar to that utilized by Harjusola-Webb and Robbins (2012) during the workshop. While manuals and workshops are common forms of professional development across the field of ECSE, in the current study, they did not produce the desired outcome of teacher implementation of the milieu teaching strategies with procedural fidelity during the workshop baseline phase.

The workshop may have familiarized the teachers with some of the strategies, and according to the data, all teachers implemented parts of the strategies during the workshop baseline condition. However, very few of the strategies could be counted as correctly implemented due to lack of procedural fidelity. Examples of lack of fidelity that were demonstrated by all three teachers during the baseline condition included the following: missed opportunities to prompt for more elaborate behaviors when the child initiated language, child’s attention being drawn away from his or her original focus, and missed opportunities to limit access in order to elicit communication. In essence, the knowledge gained from the workshop and planning sessions did not produce the desired
results in the teachers—correct implementation of the milieu teaching strategies. During the coaching intervention condition, the data show an immediate increase in number of correctly implemented strategies for all three teachers. The immediacy of change in teacher fidelity of implementation supports the claim that performance-based, contextually relevant support is needed to transfer knowledge into practice (Neuman & Cunningham, 2009; Neuman & Wright, 2010; Mudd & Wolery, 1987).

**Focus on Quality Implementation**

While the current study does align with previous studies concerning the use of coaching to promote fidelity of implementation of strategies learned in workshops, there are unique factors in the study that contribute further to the literature base. The study is unique in that the coaching was used to support the correct implementation of the milieu strategies, with an emphasis on procedural fidelity. In other words, the current study focused not only on increasing quantity or frequency, of teachers' use of the identified strategies, but also considered qualitative features of use. Specifically, the strategies were not counted as correct unless the teacher followed all procedural steps for the specific milieu strategy, utilized the correct milieu strategy for the child’s current level of functioning, and did not interfere with the child's focus or interest. Rather than focusing on only increasing number of individual strategies, the current study examined the use of coaching to support the use of strategies that include multiple steps, as well as contingent responding, based on the individual child’s communicative behavior. This focus on quality, as well as quantity, allowed for the milieu teaching strategies to be utilized as
intended and described in research (Hemmeter & Kaiser, 1994; Hancock & Kaiser, 2006; Hancock & Kaiser, 2002; Kaiser, Hancock, & Nietfeld, 2000).

**Focus on Operationally Defined and Quality Coaching**

The study is also unique in the identification, operationalization, and utilization of six salient features of coaching - performance feedback, guided reflection, brainstorming / problem solving, action planning / goal setting, resource support, and demonstration - revealed through a literature synthesis (Moore & Harjuola-Webb, 2013) of coaching in ECE and ECSE. Not only are the features defined, but they are described in sufficient detail to enable the reliable coding of observable coaching behaviors, contributing to the understanding and possible replication of the coaching model. In the current study, the researcher utilized a coaching checklist to foster the consistency and quality of the support provided to the teachers during the coaching intervention condition. In addition to coaching being a loosely defined practice in professional development literature, Artman-Meeker et al. (2014) found that only half of the studies examining coaching report fidelity to the coaching model or protocol. The current study contributes to the literature base of studies with clearly defined coaching models.

All six features were evident across all of the coaching sessions. The sessions followed a format of reviewing the videos, providing performance feedback concerning correctly implemented and incorrectly or missed opportunities, reflection to compare current performance with desired performance, brainstorming to encourage increased use of milieu strategies, demonstration or role modeling to practice the strategies, and recording of an action plan based on the discussion. Finally, the researcher sent the
action plan, along with various resources (e.g. articles) concerning the implementation of milieu teaching strategies. While this consistent structure, along with the coaching fidelity checklist, ensured that the coaching was delivered consistently throughout the study, the provision of resource support became difficult as the number of coaching sessions increased. Specifically, the number of resources became limited after the first few coaching sessions. As a result, the researcher sent each teacher written examples or models of correctly implemented strategies based on their videos as a form of resource support. Additionally, the researcher noticed that the provision of the performance feedback, the teachers’ reflection on their own practice and the brainstorming and problem solving seemed to be the central features of the coaching model.

**Explanations of Findings**

As demonstrated in Chapter III, the results of the current study demonstrate a functional relationship between the coaching package and the teachers’ correct implementation of milieu strategies. During the workshop baseline phase, no teacher demonstrated more than five correctly implemented strategies. Instead, the strategies were implemented partially, incorrectly, or the opportunities were missed altogether. Once the coaching intervention started, all three teachers showed an immediate increase in the number of correctly implemented strategies. Since the coaching focused on providing positive examples, as well as corrective feedback, the teachers were able to reflect on their practice, and make adjustments. Further, the coaching occurred weekly. The timeliness and regularity of the coaching ensured that teachers had the opportunity to make corrections to their practice quickly.
While the immediacy of change in level and lack of overlapping data points indicate positive results, the trend and stability were less impressive. There were positive changes in trend for Teachers 1 and 2 from workshop baseline to coaching intervention while the trend remained the same for Teacher 3. The high variability in the data may have been due to the requirement that the teacher follow the lead of the child in order to embed the strategies. Various child factors could have impacted the opportunities available for the teacher to implement the milieu teaching strategies. For example, if a child were deeply engaged in an activity and did not need to communicate, the number of opportunities may be less than if the child needed multiple items for an area of interest.

**Teacher 1**

Teacher 1 delivered a range of zero to two correct milieu strategies during the workshop baseline phase and a range of 6 to 22 during the coaching intervention phase. During the workshop baseline phase, Teacher 1 demonstrated use of several environmental and responsive strategies, including following the child’s lead, imitating, and limited access; however, she used very few correctly implemented milieu strategies. One possible reason that the teacher was able to demonstrate the environmental and responsive strategies, and not the full milieu strategies, is that the correct milieu strategies have multiple steps that are dependent upon responding to the child’s behavior in a contingent manner. The environmental and responsive strategies are simpler to use, as they do not require the same level of adherence to a specific protocol as do the entire milieu strategies.
During the first coaching session, the teacher set the following goals for improvement: to expand the child's utterances and to prompt for more language when the child initiates communication. These areas were chosen based on the performance feedback and guided reflection components of the coaching. In engaging in these actions, the teacher was able to reevaluate her initial plan for implementation. Since the specific milieu strategies need to be matched to the child’s level of performance, the overall plan changed to use of the time delay and incidental teaching strategies.

Typically, the teacher’s correct implementation of the naturalistic strategies either increased or remained the same following the coaching session. The exception occurred following session five, which was prior to the missed week of coaching, indicating that the anomaly was not related to the missed coaching session.

In addition to the numeric data indicating a positive effect on Teacher 1’s instruction, qualitative data concerning the positive effect exists. During the final coaching session, Teacher 1 reported that, as a teacher “you can only do so much self-reflection when you’re teaching, but having (the coach) talk me through it and help me through it…it’s been awesome…I would highly recommend this.” The ongoing weekly meetings allowed the teacher and the coach to establish a comfortable rapport. During the initial coaching sessions, the teacher listened quietly during much of the performance feedback portion. As the coaching sessions progressed, the researcher noted that the teacher started contributing more of her own ideas, using terms such as model, time delay, and incidental teaching, which she did not do in the early coaching sessions.
While specific child outcomes were not measured or controlled during the study, anecdotal evidence exists to support growth for the child. Teacher 1 reported that the child achieved her annual IEP goal related to communication. Further, Teacher 1 reported that she was able to document sufficient progress for the target child in order to demonstrate the effectiveness of instruction on her annual teacher evaluation. Additionally, the teacher noted that the child was able to have a “back and forth” conversation toward the end of the school year, whereas, she had “very limited” language at the beginning of the year.

**Teacher 2**

Teacher 2 delivered a range of zero to five correct milieu strategies during the workshop baseline phase and a range of ten to twenty-two during the coaching intervention phase. A repeated error in implementation for Teacher 2 during the baseline phase was that she provided several opportunities for the child to request the same item repeatedly without expanding the child’s utterance or prompting for more elaborate behavior. One possible reason for this pattern is that the child had a limited repertoire of favored items. When the teacher approached the child to enter into her play, the child would often walk away. Once the teacher introduced the bubbles, the child did use the label “bubbles” to request them. While the teacher provided access to the child, she did not use any verbal feedback. This pattern of child requesting and teacher providing access continued without the teacher encouraging more advanced language.

During the coaching sessions, Teacher 2 asked questions of the coach concerning her delivery of the milieu teaching strategies, as well as issues concerning behavior and
IEP compliance. The teacher regularly contributed ideas during brainstorming sessions and asked for specific ways to improve her teaching. Specifically, during one session, the teacher was able to develop a plan that was based on the child’s interests and extended the child’s language. During a final coaching session, Teacher 2 stated that the coaching helped her to see how many instructional opportunities she can provide in a short period of time. The teacher’s readiness to ask questions and brainstorm may have contributed to the increasing trend of the data demonstrated during the coaching phase.

Teacher 2 reported positive changes for the child. For example, the child achieved her annual IEP goal related to communication: to use 1-2 words to communicate wants/needs/requests. In addition, both the teacher and the child's parents noticed an increase in spontaneous requesting by the child. At the beginning of the study, the child typically required a verbal prompt to make requests. At the end of the study, the child was initiating requests for favored items using three-word utterances (i.e. I want balloon, let it go, blow more bubbles). Additionally, the child was using the “I want” phrase for food items and favorite activities at home.

Teacher 3

Teacher 3 delivered a range of zero to five correct milieu strategies during the workshop baseline phase and a range of seven to twenty-five during the coaching intervention phase. Several errors were noted in the baseline recorded sessions, primarily involving lack of feedback given to child based on language and limited use of antecedent strategies. The teacher missed several opportunities to use environmental arrangement strategies.
During the coaching sessions, the teacher set the following goals: to set up the environment by limiting access to necessary materials and to respond to child-initiated behaviors by using the model procedure to illicit more language. While Teacher 3 showed an immediate increase after the first two coaching sessions, her performance dipped after the third. Following the dramatic decrease, the researcher shared scripted examples based on the video clips. The teacher's performance improved after each of the subsequent coaching sessions. One possible explanation concerning the variability for Teacher 3 was revealed during a conversation with the researcher at the end of the study. Teacher 3 shared that she rarely reviewed the written feedback and action plan, which was sent via email within 24 hours of the coaching session. She stated that she took personal notes during the coaching sessions. The lack of review of the written feedback and plan may have been an influencing factor regarding her inconsistent implementation of the strategies. Additionally, the researcher noted that Teacher 3 stopped utilizing as many environmental and responsive strategies during the middle intervention sessions. Since those strategies are used to set the stage for communication (Hemmeter & Kaiser, 1994; Hancock & Kaiser, 2002; Kaiser, et al., 2000), the reduction in frequency of correctly implemented strategies would be logical. The coaching sessions, therefore, focused more on the environmental and responsive strategies, limiting the ability to highlight full implementation of the milieu strategies. Finally, Teacher 3’s coaching sessions began in May, with only six weeks left in the school year. The end of school year timeframe brought changes in routines, which impacted the teacher’s ability to maintain consistency.
Teacher 3 reported positive changes for the child. Specifically, she stated that the child was using more language in the classroom. It should be noted that the teacher’s increased attention to scaffolding the child’s language may have contributed to this perception. During one of the last coaching sessions, Teacher 3 stated that she "appreciated" the coaching sessions, and that she found them to be "helpful."

**Summary of explanations.** Fixen et al. (2005) noted that the purpose of coaching is to help teachers incorporate the core components of the intervention into their teaching style. As noted previously, all teachers were able to implement at least some of the environmental and responsive strategies prior to receiving coaching. The teachers were able to at least begin the milieu strategies that depended upon a teacher delivered antecedent. The teachers struggled with completing all of the procedural steps for the milieu strategies, including prompting for additional language, or expanding the child’s utterance. Even though similar patterns were noticed across all three teachers and all steps of the coaching package were followed for each coaching session, the conversations were tailored to the individual teacher’s needs. Each teacher had her own style, her own concerns, and needed a chance to reflect upon her own practice. Further, the coaching encouraged teachers to engage in a regular decision-making process, allowing them to adapt their teaching practices to meet the changing needs of the children.

**Threats to Validity**

The following section addresses possible threats to internal and external validity. Internal threats are factors, other than the coaching intervention, that may have
contributed to the results (Gast & Ledford, 2010; Kratchowill et al., 2010). External threats are factors that limit the reproducibility of the results (Horner et al., 2005).

**Internal Threats**

The following threats to internal validity must be considered when interpreting the results of the current study: history, maturation, testing, statistical regression, selection, ambiguous temporal precedence, instrumentation, and attrition (Kratchowill et al., 2010). For studies utilizing multiple-baseline across participants research design, many internal threats are controlled by the structure of the study, as well as replication of the effect following the delivery of the intervention (Gast & Ledford, 2010; Kratchowill et al., 2010). In the following section, I will address possible internal threats to validity.

**History, testing, and maturation.** The threats of history, testing, and maturation are controlled in multiple-baseline studies in the event that the dependent variable remains stable until the introduction of the independent variable, and an immediate effect is noted and replicated across conditions upon delivery of the intervention (Gast & Ledford, 2010). A specific threat that may be relevant to the current study is history. History is a threat to validity if the effect can be attributed to a factor that occurred in the past, or at the same time, as the independent variable (Kratchowill, 2010). For the current study, all teachers attended a workshop prior to the collection of the baseline data and demonstrated low numbers of correctly implemented strategies during that phase, indicating that the workshop did not produce the effect. Additionally, all teachers engaged in some form of planning time with speech and language therapists, during which communication promoting strategies may have been addressed or discussed. It is
unlikely that the meetings caused the effect, however, due to the fact that the meetings occurred prior to the study, during baseline phase, and in intervention phase, yet the effect was not noted until the introduction of the coaching intervention. An immediate increase in correct implementation of the milieu teaching strategies was observed across all three teachers after the staggered onset of the coaching intervention condition. Teacher 4 (who did not receive the coaching intervention) never utilized more than two milieu teaching strategies with fidelity during the workshop baseline. The stable and low number of correctly implemented strategies during workshop baseline and the immediate increase during the staggered introduction of the coaching intervention replicated across three participants indicates limited internal threats of history, testing, and maturation (Gast & Ledford, 2010).

**Statistical regression, selection, ambiguous temporal precedence, and instrumentation.** The threats of statistical regression, selection, ambiguous temporal precedence, and instrumentation must also be considered. According to Kratochwill (2010), statistical regression may pose a threat if participants of the study are chosen based on need, while selection is a threat when introduction of the intervention is based on need. The teachers were representative of ECSE teachers in Michigan, and all four teachers showed very low levels of correct implementation of the strategies during baseline, minimizing statistical regression or selection as threats. Ambiguous temporal precedence is a threat if it is not clear when the variables were introduced or measured (Kratchowill, 2010). The researcher actively and intentionally manipulated the staggered introduction of the coaching package across three different participants, limiting the
likelihood of ambiguous temporal precedence (Gast & Ledford, 2010; Kratchowill, 2010). Finally, instrumentation was not a threat due to an acceptable level of inter-rater reliability (Gast & Ledford, 2010).

**Attrition.** Attrition is a threat if participants withdraw during the study (Kratchowill, 2010). While Teachers 1 and 2 were consistent in submitting video files for review, Teacher 3 and 4 were less dependable. As previously mentioned, the child in Teacher 3’s classroom was absent for an entire week, during week 6. Another possible explanation may be that Teacher 3 did not receive the coaching intervention until late in the study, while Teacher 4 did not receive coaching at all. Therefore, the teachers may have seen less value in regular submission. Additionally, Teacher 4 required a change in video recorders three times during the study, as the first two stopped working. The likelihood of attrition presenting a threat to the study is limited, however, as at least five data points were collected per phase per condition, and the results were replicated across at least three administrations of the intervention (Kratchowill et al., 2010).

**External Threats**

The current study involved only four participants, with only three participants receiving the coaching intervention. The low number of participants limits the overall ability to generalize the results of the study. Despite the limited number of participants, Horner et al. (2010) assert that external validity is enhanced if the same pattern (i.e. immediate change in level, overall change in mean, and lack of overlapping data) can be demonstrated across at least three conditions. Such patterns were established in the current study. The external validity would be increased if the same results were noted
across further studies with additional researchers (Horner et al., 2005). Another possible threat to external validity is all three teachers were experienced teachers with credentials in special education and early childhood education. However, in Michigan, teachers who work with young children with disabilities are required to hold the same credentials as the participating teachers. For this reason, the teachers were representative of ECSE teachers in Michigan. It is unclear whether similar results would be noted with less experienced teachers or teachers without similar credentials.

**Limitations**

Several limitations should be considered when interpreting the findings of the study, including variable performance, timing of the study, use of technology, and teacher generalization.

**Variable Performance**

During the coaching intervention, an immediate change in level was evident across all three teachers. However, the data showed a high level of variability during the coaching intervention phase for all three teachers. In addition, Teacher 3 showed a downward trend in during the coaching intervention phase when the split middle method for calculating trend was used. Even though there were high variability and the trend remained downward for Teacher 3, her last data point was high. Since the end of the school year had arrived, it is not possible to determine if the teacher would have continued to make improvements; thereby increasing the trend. While the variability was high for all three teachers, teacher 1 and 2 showed a positive effect in trend.
Timing of the Study

An additional limitation was the timing of the study, specifically, that the study took place during the second half of the school year. Teacher 3 did not receive the coaching intervention until May, approximately five weeks before the end of the school year. The teacher reported many changes to the regular existing schedule toward the end of May and beginning of June related to special activities and teacher participation in required meetings. Further, the paraprofessional assigned to the classroom injured her shoulder in May and was on medical leave during the study. Such disruptions in the schedule and staff may have impacted the teacher’s overall performance.

Use of Technology

Additional limitations pertain to the use of the technology as a mechanism to engage in the coaching intervention. Specifically, the teachers needed access to a strong internet connection in order to upload and share videos. While the school districts provided internet in each classroom, teachers found that they were not able to upload videos when working over a wireless connection. In other words, the teachers had to have their computers wired into the districts’ servers in order to upload the videos. Even when connected, teachers often found the uploading of videos to take a long time. It was not uncommon for teachers to start the upload process before they left work and allow the process to continue into the evening.

An additional limitation related to technology was that the videos needed to be stored and shared in a secure location to maintain student confidentiality. A password protected Dropbox was used for the current study. While the Dropbox proved to be
useful, teachers needed to be taught how to access the secure area. The technology
department of the regional service agency was able to support the access and use of the
secure area.

Further, the videos needed to be recorded with a device that is easy to use and
saved in a format compatible with a variety of operating systems. This requirement
proved to be difficult for some of the teachers. Specifically, Teacher 3 needed to try two
different cameras before one would work. The first camera would not remain charged.
Teacher 4 tried three different devices before finding one that would work. Specifically,
she used a tablet that would not allow the session to be recorded in a format that was
recognizable by the researcher’s system. The second device was a camera that would
only record sound. Finally, the third device was a camera that required batteries, which
needed to be regularly replaced.

A final limitation concerning technology was the use of the web-conferencing
software. The current study utilized Adobe Connect © for the coaching sessions. This
program is not free of charge; therefore, some organizations may not be able to afford
such a platform. However, it should be noted that the platform was easy to use, as the
teachers only needed a link to access the virtual meeting space. Additionally, teachers
were not required to be wired into the district server during the coaching session.

**Teacher generalization**

A final limitation pertains to the lack of knowledge concerning whether or not the
teachers generalized the knowledge and skills gained throughout the study. Specifically,
the data were collected using video recordings of the classroom during play activities. As
such, it cannot be determined whether or not the teachers continued to implement the milieu strategies throughout the entire day or with other children in their classrooms.

**Implications**

The current study contributes to the growing body of literature supporting the need for coaching as a form of professional development. Such research has a variety of implications, including need for coaching as part of professional development, the use of technology to deliver coaching, and acceptability of coaching from a practitioner’s point of view.

**Coaching as Part of Professional Development**

Research demonstrating the value of coaching a part of professional development efforts has implications for policy-makers, administrators, and professional development providers. From a policy perspective, ongoing professional development is a requirement to continue a teacher’s certification. However, there is no requirement that the professional development include follow up support to ensure transfer of knowledge and skill in the classroom. Policy makers need to examine how professional development is defined regarding renewal of teacher certification. Perhaps evidence of implementation of the professional development content should be required, rather than simply the attendance at a workshop. Administrators often guide the content, as well as the structure, of the professional development opportunities provided to their staff. Administrators should consider how to provide on-going support for implementation. Finally, professional development providers need to offer opportunities for coaching as a part of their professional development offerings.
The Use of Technology to Deliver Coaching

The use of technology has implications for the feasibility and effectiveness of coaching. Concerning feasibility, the availability of web-conferencing technologies and video capturing tools can increase the ability to provide coaching. Specifically, use of distance technologies can reduce the time commitment required to engage in coaching. Concerning effectiveness, distance coaching has been shown to have similar results as on-site coaching in supporting correct implementation of research-based practices (Rubel et al., 2013). Given the demonstrated effectiveness of distance coaching, it is important to consider access to and use of technology in coaching practices.

As distance coaching grows in popularity, it will be important for school districts to invest in tools to support coaching, as well as training to use such tools. In the current study, the researcher needed to work with teachers to find video capturing devices that were easy to use, and that would allow for videos to be saved in acceptable formats. While a variety of web applications exist to support these tasks, time was needed to ensure teachers had the technology skills to participate fully in the coaching intervention. Additionally, most school districts have access to secure servers to allow for safe sharing and storage of video files. However, many school districts have firewalls, which can create barriers to this type of coaching practice. In the current study, the researcher and teachers utilized the same technology department, reducing the issues of firewalls and access.

A final consideration in the use of technology to support coaching involves teacher perceptions of being video recorded in their classrooms. It can be initially
uncomfortable to view oneself on video. However, repeated viewings can help to reduce such negative feelings. For the current study, the researcher acknowledged comments made by the teachers concerning hesitancy at viewing themselves on video and reminded them that the focus of the review was on their actions, as well as the child’s actions.

**Acceptability of Coaching**

As described above, all three of the teachers who received the coaching intervention described the experience positively in conversation with the researcher and in the survey conducted after the study. One consideration pertaining to the acceptability of the current coaching model is that the coach had no supervisory responsibilities. In other words, the teachers were assured that their participation would not impact their annual job performance reviews. The relationship the coach built with each teacher was based on the shared goal of improving practice.

An additional factor which may have contributed to the overall acceptability of the coaching was that the teachers understood the role of the coach, their role in the coaching, and the purpose of the coaching. Whitebrook et al. (2009) noted that the roles and responsibilities of coaches need to be clearly defined. In the current study, teachers were informed from the beginning that the coaching would focus specifically on improving their use of the milieu strategies. The teachers understood that the researcher would be highlighting correct use of the strategies and working with the teacher to brainstorm ways to improve implementation. The researcher reminded the individual teachers of the format prior to each coaching session and encouraged questioning from
the teachers throughout. It is doubtful that the teachers would have perceived the coaching positively if the intent and the role of the researcher were not clear.

A final factor which may have improved the acceptability of the coaching was the interaction style of the researcher throughout the coaching sessions. As mentioned in a previous section, the researcher was able to tailor the coaching sessions to each teacher’s style. The researcher took care to acknowledge correct implementation of the milieu strategies and positive examples of the environmental and responsive strategies before providing corrective feedback. Additionally, the researcher encouraged questions from the teacher and made sure to record answers to the questions in the written plan. Finally, the researcher encouraged the teachers to reflect on their practice and develop their own goals and action plans.

**Future Directions**

While the current study supports the use of a coaching package to support teachers’ implementation of milieu teaching strategies learned in a workshop setting, the field of ECSE could benefit from further research. Three specific areas warranting further research are provision of coaching to large numbers of teachers, how to identify and train potential coaches, and continued focus on describing coaching models.

**Provision of Coaching to Large Numbers of Teachers**

Further research concerning the feasibility of providing coaching to a larger sample of teachers would be merited. One way to make coaching available to large numbers of teachers is through peer coaching models (Joyce & Showers, 2008, Tschantz & Vail, 2000). Such models use expert teachers in the same building or system to
provide coaching to their fellow teachers. Additionally, coaching for a variety of professionals working with children with disabilities should be studied. For the current study, all participating teachers were credentialed and experienced in working with children with disabilities. The coaching served to refine skills rather than teach completely novel concepts. Research including a broader sample of the professionals working in the field of ECSE would be valuable. For example, children with disabilities are often placed in inclusive classrooms. The teachers and other early childhood professionals in such community based settings may not have formal training in special education. Research examining the use of coaching for fidelity of implementation for novice teachers would be beneficial. Finally, the current study examined an individual coaching model. Further study could focus on group coaching models.

**Identifying and Training Potential Coaches**

Another area requiring additional study is how to identify and train potential coaches. Artman-Meeker et al., (2014) found that all of studies analyzing coaching in ECSE used the researcher as the coach, which may impact the viability of maintaining coaching interventions. For the current study, the researcher was the coach and a training and technical assistance provider in the teachers’ regional service agency. The role of training and technical assistance provider includes professional development responsibilities. Further research examining the feasibility of regional service area training and technical assistance providers serving as coaches would be valuable.
Continued Focus on Describing Coaching Models

While the current study examined the fidelity to the coaching model, further study examining the features would be warranted. For example, while the resource support feature was delivered in each coaching session for the current study, it is not clear if that feature needed to be a part of each session. Additionally, little is known about the optimal dosage or format of coaching interventions. Further descriptions would greatly benefit those responsible for delivering professional development to teachers and other practitioners.

Conclusion

The purpose of the study was to examine the impact of a coaching package on teachers’ correct implementation of milieu teaching strategies in early childhood special education classrooms. The findings suggest that the professional development workshop alone was not effective in ensuring implementation. An increase in correctly implemented strategies was found for all three teachers who received the coaching package. The findings of the study add to the literature base supporting the need for coaching to support implementation of effective practices.
APPENDICES
APPENDIX A

TEACHER CONSENT FORMS
Appendix A

Teacher Consent Forms

AUDIOTAPE/VIDEO CONSENT FORM

Effect of Coaching on Teachers' Use of Naturalistic Strategies
Sanna Harjuosa-Webb

I agree to be videotaped as a part of this project and for the purpose of data analysis. I agree that Sanna Harjuosa-Webb and Lydia Moore view the videos.

______________________________
Signature

______________________________
Date

Sanna Harjuosa-Webb and Lydia Moore may / may not (circle one) use the audio-tapes/video tapes made of me. The original tapes or copies may be used for:

____ this research project _____ publication _____ presentation at professional meetings

______________________________
Signature

______________________________
Address

______________________________
Date

[Stamp: OCT 0-9 2013]

[Stamp: OCT 0-8 2014]

81
Teacher Participant Consent Form
Informed Consent to Participate in a Research Study

Study Title: *Effect of Coaching on Teachers' Use of Naturalistic Strategies*

Principal Investigator: *Sanna Harjuola-Webb* and *Lydia Moore*

You are being invited to participate in a research study. This consent form will provide you with information on the research project, what you will need to do, and the associated risks and benefits of the research. Your participation is voluntary. Please read this form carefully. It is important that you ask questions and fully understand the research in order to make an informed decision. You will receive a copy of this document to take with you.

**Purpose:** *This study will measure the effectiveness of an online teacher coaching model of professional development.*

**Procedures**
All participants will be using naturalistic teaching strategies designed to promote communication skill development of young children. Each participant will video 15 minutes of play or choice time per week. The participant will submit the video to a secure Dropbox. Later in the week, the teacher will attend a 15-30 minute coaching session with Lydia Moore, co-investigator using Adobe Connect.

**Audio and Video Recording and Photography**
The teacher will be video recording the teaching session for two purposes. The first is to allow the teacher to reflect on her own practice and receive feedback from the professional development provider, Lydia Moore. The second will be to allow the researcher to measure the teacher’s implementation of the practices. These recordings will be destroyed upon completion of the study. The videos will not be used for any other purpose than those mentioned. The Adobe Connect sessions will be recorded to ensure the researcher adheres to the coaching protocol. All recordings will be destroyed upon completion of the study.

**Benefits**
The potential benefits of participating in this study may include a greater understanding of evidence based practices for young children, generalization of the knowledge, and increased use of the practices.

**Risks and Discomforts**
You may feel uncomfortable being videotaped in your classroom.

*Effect of Coaching on Teachers' Use of Naturalistic Strategies*
Privacy and Confidentiality
Identifying information will not be made available in the publications and/or presentations of the research data.

Your study related information will be kept confidential within the limits of the law. Any identifying information will be kept in a secure location and only the researchers will have access to the data. Research participants will not be identified in any publication or presentation of research results.

Voluntary Participation
Taking part in this research study is entirely up to you. You may choose not to participate or you may discontinue your participation at any time without penalty or loss of benefits to which you are otherwise entitled. You will be informed of any new, relevant information that may affect your health, welfare, or willingness to continue your study participation.

Contact Information
If you have any questions or concerns about this research, you may contact Lydia Moore at 248-209-2308 or Sanna Harjuola-Webb at 330-672-0585. This project has been approved by the Kent State University Institutional Review Board. If you have any questions about your rights as a research participant or complaints about the research, you may call the IRB at 330.672.2704.

Consent Statement and Signature
I have read this consent form and have had the opportunity to have my questions answered to my satisfaction. I voluntarily agree to participate in this study. I understand that a copy of this consent will be provided to me for future reference.

Participant Signature __________________________ Date __________

Effect of Coaching on Teachers' Use of Naturalistic Strategies
APPENDIX B

PARENTAL CONSENT FORMS
Appendix B

Parental Consent Forms

AUDIOTAPE/VIDEO CONSENT FORM

Effect of Coaching on Teachers' Use of Naturalistic Strategies
Sanna Harjuola-Webb

I agree to be videotaped as a part of this project and for the purpose of data analysis. I agree that Sanna Harjuola-Webb and Lydia Moore view the videos.

_______________________________  ____________________
Signature                        Date

Sanna Harjuola-Webb and Lydia Moore may / may not (circle one) use the audio-tapes/video tapes made of me. The original tapes or copies may be used for:

____ this research project  ____ publication  ____ presentation at professional meetings

_______________________________  ____________________
Signature                        Date

Address:

85
Parental Consent
Informed Consent to Participate in a Research Study

Study Title: Effect of Coaching on Teachers’ Use of Naturalistic Strategies

Principal Investigator: Sanna Harjuolo-Web and Lydia Moore

Your child is being invited to participate in a research study. This consent form will provide you with information on the research project, what your child will need to do, and the associated risks and benefits of the research. Your child’s participation is voluntary. Please read this form carefully. It is important that you ask questions and fully understand the research in order to make an informed decision. You will receive a copy of this document to take with you.

Purpose: This study will measure the effectiveness of an online teacher coaching model of professional development.

Procedures
Your child’s teacher will be using naturalistic teaching strategies designed to promote communication skill development of young children. Examples of these strategies are modeling language, expanding upon child’s utterances, and prompting for more elaborate language. The researcher will review your child’s IEP and present level assessment information with your child’s teacher to ensure that the strategies would be warranted for use with your child. Each teacher will video 15 minutes of instruction during play or choice time per week. The instruction will occur within the context of your child’s typical routine. The teacher will submit the video to a secure Dropbox. Later in the week, the teacher will attend a 15-30 minute coaching session with Lydia Moore, co-investigator using Adobe Connect ©.

Audio and Video Recording and Photography
The teacher will be video recording the teaching session for two purposes. The first is to allow the teacher to reflect on her own practice and receive feedback from the professional development provider, Lydia Moore. The second will be to allow the researcher to measure the teacher’s implementation of the practices. These recordings will be destroyed upon completion of the study. The videos will not be used for any other purpose than those mentioned. The Adobe Connect sessions will be recorded to ensure the researcher adheres to the coaching protocol. All recordings will be destroyed upon completion of the study.

Benefits
The potential benefits of participating in this study for teachers may include a greater understanding of evidence based practices for young children, generalization of the knowledge, and increased use of the practices. The potential benefit for your child will be increased exposure to evidence based communication promoting strategies.

**Risks and Discomforts**
There are no anticipated risks beyond those encountered in everyday life. Your child may choose to participate in the activities, just as he or she would in the typical preschool day.

**Privacy and Confidentiality**
Identifying information will not be made available in the publications and/or presentations of the research data.

Your child’s study related information will be kept confidential within the limits of the law. Any identifying information will be kept in a secure location and only the researchers will have access to the data. Research participants will not be identified in any publication or presentation of research results.

**Voluntary Participation**
Taking part in this research study is entirely up to you and your child. You and/or your child may choose not to participate or may discontinue their participation at any time without penalty or loss of benefits to which he/she is otherwise entitled. You will be informed of any new, relevant information that may affect your child’s health, welfare, or willingness to continue participation in this study.

**Contact Information**
If you have any questions or concerns about this research, you may contact Lydia Moore at 248-209-2308 or Sanna Harju-Sola-Webb at 330-672-0585. This project has been approved by the Kent State University Institutional Review Board. If you have any questions about your rights as a research participant or complaints about the research, you may call the IRB at 330.672.2704.

**Consent Statement and Signature**
I have read this consent form and have had the opportunity to have my questions answered to my satisfaction. I voluntarily agree to grant permission for my child to participate in this study. I understand that a copy of this consent will be provided to me for future reference.

Parental Signature __________________________ Date __________________________

*Effect of Coaching on Teachers' Use of Naturalistic Strategies*
APPENDIX C

EMBEDDED RECORDING MEASURE
Appendix C:

Embedded Recording Measure

Video title: ____________________________________________________________

Starting point: ___________________________ Ending point: ___________________

Target behavior: _______________________________________________________

Directions: Record time stamp. Mark each bubble that represents the child and teacher behaviors with a check mark. Note: in the feedback area, mark “provide access” with a check if yes, an X if not applicable (i.e. the child did not make a request) or leave blank for no. Any bubble left blank will indicate “no”

Complete: Mark Y for yes or N for no. Yes means all an antecedent and feedback were present. In the Antecedent column, at least one above thick line and one below thick line should be present – if the first one below thick line was checked, then one other should also be checked – if the child initiates communication and the teacher does not respond, end here and mark N for complete and correct).

Correct: Yes means teacher delivered the correct A for the target behavior, correct C given the child’s response (including all of the applicable components. If the child did not request, mark an X in the provide access box to indicate not applicable), followed child’s lead and did not interfere with focus or interest.

<table>
<thead>
<tr>
<th>Time</th>
<th>Antecedents</th>
<th>Adult</th>
<th>Child Response</th>
<th>Feedback</th>
<th>Complete?</th>
<th>Correct?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>o Access</td>
<td>o Did not interfere with child focus or interest</td>
<td>o Child responded at target level</td>
<td>o Provide access (if child made a request)</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>o Unexpected event</td>
<td></td>
<td></td>
<td>o Expansion</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>o Insufficient materials</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Nonverbal imitation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Verbal mirror</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Follow lead</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Child initiated (if so, check adult response below)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Verbal model</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Mand (question or command)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Time delay</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX D

COACHING FIDELITY MEASURE
Appendix D

Coaching Fidelity Measure

Directions: At least one example should be present for each component (performance feedback, guided reflection, brainstorming/problem solving, action planning / goal setting, resource supports, demonstration)

<table>
<thead>
<tr>
<th>Performance feedback</th>
<th>Yes</th>
<th>No</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Researcher showed teacher examples (from his or her submitted video recording) of correct use of various strategies.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Researcher showed teacher examples (from his or her submitted video recording) of incomplete instructional units, missed opportunities, or provided ideas on how to improve overall delivery of complete instructional units, highlighting possible ways to increase antecedents or provide consequences.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Guided reflection

Following the review of the video examples, the researcher asked the teacher to compare her performance to the core components of the naturalistic strategies, using the Embedded Checklist.

<table>
<thead>
<tr>
<th>Brainstorming / Problem solving</th>
</tr>
</thead>
<tbody>
<tr>
<td>The researcher and teacher generated ideas to arrive at a solution to a specific dilemma</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Action planning / Goal setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action plan: The researcher recorded the teacher’s identified goal for the upcoming week.</td>
</tr>
</tbody>
</table>

Resource support

The researcher sent an email of the completed rubric and action plan within 24 hours of coaching session.

The researcher sent additional information (ie link to a website, article, or document) to support the teacher’s implementation.

<table>
<thead>
<tr>
<th>Demonstration</th>
</tr>
</thead>
<tbody>
<tr>
<td>The researcher used examples from the video or other examples (verbal or in print) to demonstrate how to correctly follow the procedural steps for the various strategies.</td>
</tr>
</tbody>
</table>
APPENDIX E

TEACHER PERCEPTION SURVEY
Appendix E

Teacher Perception Survey

1. To what degree do you agree or disagree with the following statements?

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embedding naturalistic learning opportunities in child focused activities positively impacts child outcomes.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Embedding naturalistic learning opportunities in child focus activities is in line with my philosophy of how young children learn.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The verbal feedback highlighted positive experiences in my classroom.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The verbal feedback helped me to embed more learning opportunities into child focused activities.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The verbal feedback supported me in using strategies learned in the professional development workshops.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The feedback sessions were a good use of my time.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Reviewing the video examples helped me to better understand embedded learning.

Reviewing the video examples helped me to embed more opportunities.

The written feedback and rubric highlighted my teaching practices.

The written feedback / rubric lead to my embedding more activities into child focused activities.

The written feedback / rubric supported me in using strategies learned in the professional development workshops.

2. Please use this space to give any other feedback concerning the weekly meetings or the workshop experience.
APPENDIX F

POWERPOINT HANDOUT
### Arrange the Environment

<table>
<thead>
<tr>
<th>Name</th>
<th>What it is</th>
<th>When to use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>Adult limits access to desired material or activity to elicit a communicative response from the child.</td>
<td>Child has demonstrated interest in certain items / toys / activities / materials</td>
</tr>
<tr>
<td>Unexpected event</td>
<td>Adult performs an action that is different than what the child expects in order to elicit a communicative response from the child.</td>
<td>Child is familiar with specific routines, songs, fingerplays, or play sequences.</td>
</tr>
<tr>
<td>Insufficient materials</td>
<td>Child is not given enough or correct materials needed.</td>
<td>Child is familiar with certain sets of toys or materials</td>
</tr>
</tbody>
</table>
FOLLOWING THE CHILD’S LEAD

- Adult becomes involved in what the child is doing, relating his or her own behavior to the object or activity of the child’s focus.
- Strategy must not interfere with the child’s focus or interest.

ENGAGING STRATEGIES

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Appropriate when...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonverbal imitation</td>
<td>Adult performs the exact same motor actions on matching or comparable objects as the child.</td>
<td>Child is engaged in play activity.</td>
</tr>
<tr>
<td>Verbal mirror</td>
<td>Adult engages in nonverbal imitation and describes the movements.</td>
<td>Child is engaged in play activity.</td>
</tr>
</tbody>
</table>
SPECIFIC TEACHING STRATEGIES

- Strategies
  - Model
  - Mand-model
  - Time delay
  - Incidental teaching

MODEL

- Follow child’s lead
- Establish shared attention (engaging strategies)
- Say a word, phrase, or sentence
  - (+) If the child imitates, acknowledge, provide access, and expand the utterance.
  - (-) If the child does not imitate, present a second model prompt (corrective feedback).
**MAND-MODEL**

- Observe child’s focus of attention
- Ask a question or makes a statement that requires a verbal response.
  - (+) If the child responds with target behavior, acknowledge what the child said, provide access, and expand the utterance.
  - (-) If the child does not respond with target behavior, present a model prompt (corrective feedback).

**TIME DELAY**

- Follow child’s lead
- Use engaging strategies
- Plan a delay in a predictable routine OR wait for a child to initiate comment / behavior / request
  - (+) If the child responds with target behavior, acknowledge what the child said, provide access, and expand the utterance.
  - (-) If the child does not respond with target behavior, present a mand or a model prompt (corrective feedback).
INCIDENTAL TEACHING

- Identify child initiation
- Request an expansion
- Give the child an opportunity to respond
  - If child responds correctly, respond to content of initiation
  - If child does not respond correctly, provide appropriate level of prompts / feedback

<table>
<thead>
<tr>
<th>Strategy</th>
<th>When to use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>Child is in the acquisition phase of learning basic vocabulary or requesting behaviors, or in generalization phase of imitation (e.g., child is not able to generate the words on his or her own)</td>
</tr>
<tr>
<td>Mand - model</td>
<td>Child is in the fluency / generalization phase of learning words or requesting behaviors and / or in acquisition phase of responding to questions</td>
</tr>
<tr>
<td>Time delay</td>
<td>Intended for use when child is learning to initiate communicative behaviors</td>
</tr>
<tr>
<td>Incidental teaching</td>
<td>Intended to be used to elicit more elaborate behaviors based on a child’s self-initiated behavior</td>
</tr>
</tbody>
</table>
APPENDIX G

CONCEPT MAP
Appendix G

Concept Map

First, arrange the environment and / or engage the child (choose one or more)

<table>
<thead>
<tr>
<th>Name</th>
<th>What it is</th>
<th>When to use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>Adult limits access to desired material or activity to elicit a</td>
<td>Child has demonstrated interest in</td>
</tr>
<tr>
<td></td>
<td>communicative response from the child.</td>
<td>certain items / toys / activities / materials</td>
</tr>
<tr>
<td>Unexpected</td>
<td>Adult performs an action that is</td>
<td>Child is familiar with specific</td>
</tr>
<tr>
<td>event</td>
<td>different than what the child expects in order to elicit a communicative</td>
<td>routines, songs, fingerplays, or play sequences.</td>
</tr>
<tr>
<td></td>
<td>response from the child.</td>
<td></td>
</tr>
<tr>
<td>Insufficient</td>
<td>Child is not given enough or correct</td>
<td>Child is familiar with certain sets of</td>
</tr>
<tr>
<td>materials</td>
<td>materials needed.</td>
<td>toys or materials</td>
</tr>
<tr>
<td>Nonverbal</td>
<td>Adult mimics the child’s actions</td>
<td>Child is not using words and you</td>
</tr>
<tr>
<td>imitation</td>
<td>with similar objects / toys</td>
<td>want to establish joint attention</td>
</tr>
<tr>
<td>Verbal mirror</td>
<td>Adult repeats a child’s vocalizations or words back to the child.</td>
<td>Child is using words and you want to establish joint attention</td>
</tr>
</tbody>
</table>

If child initiates a communication at the target level, expand and provide access / continue routine
If child does not initiate OR initiates below target level (e.g., points when target level is one word)
Then, choose a prompt

<table>
<thead>
<tr>
<th>Type</th>
<th>What it is</th>
<th>When to use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>Adult says a word, phrase, or sentence based on the focus of child’s</td>
<td>In fluency / generalization /</td>
</tr>
<tr>
<td></td>
<td>attention with the intention that the child will imitate what is said.</td>
<td>maintenance phase of imitation</td>
</tr>
<tr>
<td></td>
<td>The model should be the target behavior</td>
<td>In acquisition phase of learning the words (i.e. child is not able to</td>
</tr>
<tr>
<td></td>
<td></td>
<td>generate the words on his or her own).</td>
</tr>
<tr>
<td>Mand</td>
<td>An adult question or statement that requires a verbal response from the</td>
<td>In fluency / generalization phase of</td>
</tr>
<tr>
<td></td>
<td>child (a wh- question, a choice)</td>
<td>learning words AND</td>
</tr>
<tr>
<td></td>
<td></td>
<td>In acquisition phase of learning to respond to questions</td>
</tr>
<tr>
<td>Time delay</td>
<td>Adult pauses in familiar routine or activity with expectant look (wait</td>
<td>In fluency / generalization phase of</td>
</tr>
<tr>
<td></td>
<td>for 5 seconds) with the intention that the child will verbalize</td>
<td>learning words AND</td>
</tr>
<tr>
<td></td>
<td></td>
<td>In acquisition / fluency phase of initiating verbalizations</td>
</tr>
</tbody>
</table>
APPENDIX H

CRITICAL COMPONENT CHECKLIST
## Appendix H

### Training materials: Critical Component Checklist

<table>
<thead>
<tr>
<th>Critical Component</th>
<th>Definition of Critical Component</th>
<th>Rating:</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher selects a specific target act/skill to be the focus of intervention.</td>
<td>Target is measurable, developmentally appropriate, functional, relevant across contexts</td>
<td>E some criteria met</td>
<td></td>
</tr>
<tr>
<td>Prior to intervention, teacher establishes current use of skill</td>
<td>Teacher takes data on the target skills a minimum of three times in at least one child directed activity, one teacher directed activity and one routine.</td>
<td>- criteria not met</td>
<td></td>
</tr>
<tr>
<td>Teacher identifies context for intervention</td>
<td>Record the child’s schedule, develop an embedded learning schedule identifying at least three environments to embed the instruction and the intervention plan (including antecedent, response, consequence) The activity and target are matched to child interest</td>
<td>- criteria not met</td>
<td></td>
</tr>
<tr>
<td>Teachers arrange the environment to elicit target act</td>
<td>Teachers/practitioners choose motivating materials/activities to engage learners and promote the use of target skills. Teachers/practitioners manage and distribute teaching materials in a way that encourages learners to communicate. Teachers/practitioners arrange the intervention context and environment to: a. encourage the use of the target act/skill and b. maintain learners’ interests.</td>
<td>+ all criteria met</td>
<td></td>
</tr>
<tr>
<td>Teachers/practitioners engage the learner in language-rich, learner-directed, and reciprocal interactions</td>
<td>Teachers follow the child’s lead, address the child being at his/her level, respond to the child’s verbal and nonverbal initiations, provide meaningful verbal feedback, and expand utterances.</td>
<td>+ all criteria met</td>
<td></td>
</tr>
<tr>
<td>Teacher engages in Milieu teaching</td>
<td>Teachers use complete learning units</td>
<td>+ all criteria met</td>
<td></td>
</tr>
<tr>
<td>Teachers/practitioners collect and use data</td>
<td>Data is collected daily and summarized, analyzed and interpreted weekly.</td>
<td>+ all criteria met</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX I

INSTRUCTIONAL PLAN
Appendix I

Instructional Plan

Embedded Learning Opportunity – Instructional Plan

Week of: ________________________________

Target behavior:

<table>
<thead>
<tr>
<th>Antecedents / Teaching Procedures</th>
<th>Possible responses</th>
<th>Consequence / Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Document

<table>
<thead>
<tr>
<th>Activity</th>
<th>+ or -</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total + -
APPENDIX J
CODING MANUAL
Appendix J

Coding Manual

Coding Procedures

Code the first 10 minutes of each video (begin coding as soon as video starts and end at 10:00).

Record each complete learning opportunity using the codes below.

Step 1: Note the time
- Record the time stamp at the bottom of the media player as the time of each embedded opportunity

Step 2: Record the antecedent
- Definition “any event, action, condition that is designed, selected, or occur to provide a learning opportunity. Learning opportunities are created when the antecedent matches a target skill and the child’s inferred interest” (Pretti-Frontczak, 1998).
- Record any of the antecedents using codes below

<table>
<thead>
<tr>
<th>Environmental and responsive strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategy</strong></td>
</tr>
<tr>
<td>Access</td>
</tr>
<tr>
<td>Unexpected event</td>
</tr>
<tr>
<td>Insufficient materials</td>
</tr>
<tr>
<td>Nonverbal imitation</td>
</tr>
<tr>
<td>Verbal mirror</td>
</tr>
</tbody>
</table>
Follow child’s lead

Adult becomes involved in what the child is doing, relating his or her own behavior to the object or activity of the child’s focus (Hancock & Kaiser, 2002).

Antecedents related to milieu strategies

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child initiated</td>
<td>Child initiates a communicative exchange. NOTE: when this happens, the adult should utilize the model, mand-model, or time delay procedure. If the adult does so, please note below.</td>
</tr>
<tr>
<td>Model</td>
<td>Adult says a word, phrase, or sentence based on the focus of child’s attention with the intention that the child will imitate what is said (Delaney, et al., 1997).</td>
</tr>
<tr>
<td>Mand</td>
<td>Adult asks a wh-question or makes a statement that requires a verbal response from the child (a wh-question, a choice) (Delaney, et al., 1997).</td>
</tr>
<tr>
<td>Time delay</td>
<td>Adult pauses in familiar routine or activity with expectant look with the intention that the child will verbalize (Delaney, et al., 1997).</td>
</tr>
</tbody>
</table>

Step 3: Confirm that the adult did not interfere with child focus or interest
“The antecedent should have the potential of allowing the child to continue an action or maintain the child’s inferred intent or interest within the activity or with materials that are present. If the antecedent modifies or extends the child’s action or attention it must NOT shift the child’s behavior or focus away from their inferred intent or interest. In other words, an antecedent should NOT require the child to shift attention away from that in which s/he is interested or engaged.” (Pretti-Frontczak, n.d.)

Step 4: Note the Child’s Response

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child responded at target level</td>
<td>Child performed identified target behavior.</td>
</tr>
<tr>
<td>Child did not respond at target level</td>
<td>Child responded to the antecedent, but not completely or accurately OR Child did not respond, walked away OR Child refuses, engages in acting out behavior (such as screams, cries, hits, yells no)</td>
</tr>
</tbody>
</table>
Step 5: Note the adult’s feedback

<table>
<thead>
<tr>
<th>Description</th>
<th>Teacher either responds to child by giving a desired object or continuing the desired activity (Delaney, et al., 1997).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide access (if child made a request)</td>
<td>The adult expands the utterance to improve the grammar or syntax and / or the adult extends the child’s meaning / idea (Delaney, et al., 1997).</td>
</tr>
<tr>
<td>Expansion</td>
<td>“When the adult responds to the child's utterance by repeating any part of what the child said” (Delaney, et al., 1997, p. 11).</td>
</tr>
</tbody>
</table>

Step 6: Note Complete (Y N) and Correct (Y N). NOTE: If not complete, you may choose to not record. An opportunity cannot be correct if not complete.

Complete means that (1) in the Antecedent column, at least one environmental/responsive and milieu antecedent was present (one above and one below the thick line) (2) a child’s response is marked and (3) the teacher delivered some form of feedback.

Correct means that (1) teacher delivered the correct A for the target behavior (including a model, mand, or time delay for child initiated) (2) correct C given the child’s response and (3) all steps are followed, depending on child’s response (McCormick, 2014).

- If the child demonstrated the target behavior, the adult consequence is (1) provide access AND (2) expansion.
- If the child did not demonstrate the target behavior, the adult consequence is more controlling prompt for target behavior, wait for child response AND EITHER expansion and provide access (if child responded at target) OR repeat and provide access (if child did not).
References


Retrieved from What Works Clearinghouse:


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Division of the Council for Exceptional Children, 23 (3), 189-201. doi: 10.1177/088840640002300302


